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sirona
The Dental Company

CEREC AC

Service Manual

English

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1 General information

1.1 General information

Nominal line voltage ranges (CEREC Bluecam)

The acquisition unit works in the following ranges:

Rated line voltage for Europe	230 VAC / 50Hz
Rated current for Europe	1.5 A
Rated line voltage for the USA	115VAC / 60Hz
Rated current for the USA	2,7 A
Rated line voltage for Japan	100VAC / 50Hz and 60Hz
Rated current for Japan	3,0 A

Nominal line voltage ranges (CEREC Omnicam)

The acquisition unit works in the following ranges:

Rated line voltage	100-240 VAC / 50-60Hz
Rated current	4.7-1.8 A

Wireless phone interference with medical electrical equipment:

NOTICE

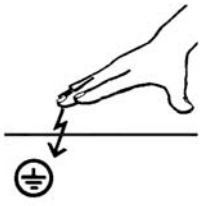
To ensure safe operation of medical electrical equipment, the use of mobile wireless phones in practice or hospital environments is prohibited.

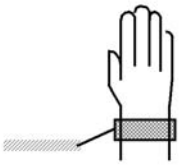
ESD warning label

⚠ CAUTION

Connector pins or sockets bearing ESD warning labels must not be touched or interconnected without ESD protective measures.

ESD protective measures





ESD protective measures include:

- Procedures for preventing electrostatic charge build-up (e.g. air conditioning, air moistening, conductive floor coverings and non-synthetic clothing)
- Discharging the electrostatic charges of your own body on the frame of the UNIT, the protective ground wire or large metallic objects
- Connecting yourself to ground using a wrist band.

Replacing parts

⚠ WARNING

Potentially lethal shock hazard when working near the power supply unit

Disconnect from the line power supply.

Check for zero potential.

Switch the unit **off** and disconnect the power plug before replacing parts.

The item numbers for ordering spare parts can be found in the spare parts list.

The diagrams contained in the spare parts list provide a useful guide when replacing parts.

Before replacing the boards, observe the ESD protective measures.

Disposal

Observe the information on disposal in the relevant operating instructions.

Installation site

Observe the information on the installation site in the relevant operating instructions.

1.2 Additional information

In addition, you also require:

CEREC AC spare parts list

Order No.: „62 31 786“

CEREC AC Wiring Diagrams

Order No.: „62 33 162“

CEREC AC Operating Instructions with Bluecam

Order No.: „62 31 174“

CEREC AC Operating Instructions with Omnicam

Order No.: „62 81 136“

Documents:

Operating the MC XL via LAN (61 90 503)

Operating MC XL via WLAN in infrastructure mode, Restoring default settings (61 90 560)

Tools

- TORX screwdriver, size 6; 8; 10; 20; 30
- Phillips screwdriver, size 1
- Blade screwdriver, insulated, sizes 2 and 3
- Universal pliers
- Flat pliers

Auxiliary tools & equipment

- Digital Multimeter, Accuracy Class 1
- Soldering tool for repairing cables
- Side cutting pliers
- Cable ties
- Teflon tape
- Fuses (recommended):

F1/F2 (2 pcs)	T8A H 250V	Order No.: 62 33 188
F3	T2,5A L 250V	Order No.: 46 57 656

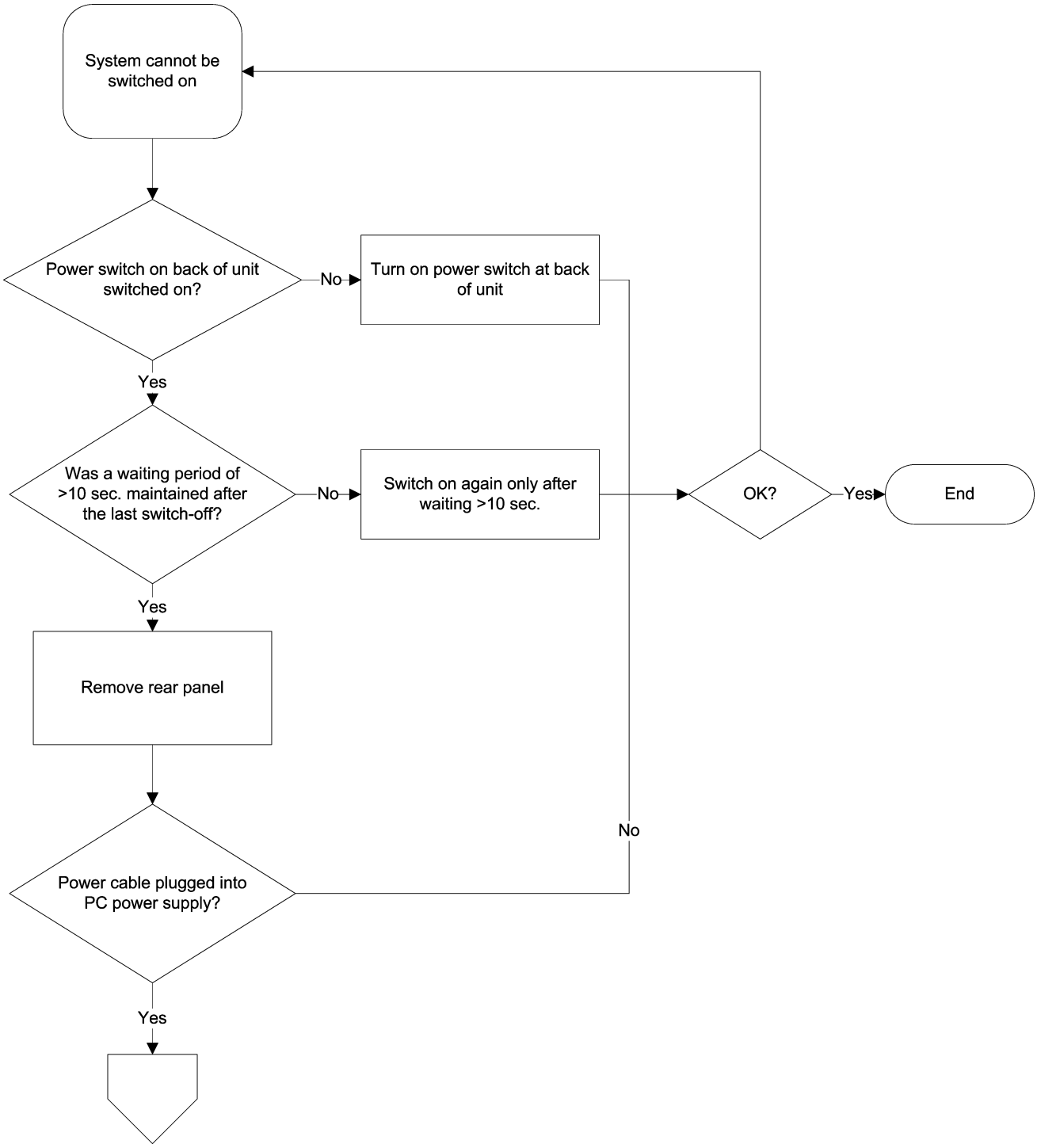
2 Troubleshooting

NOTICE

Switching the unit off

Always switch the unit off before connecting a measuring instrument or replacing parts.

2.1 System cannot be switched on



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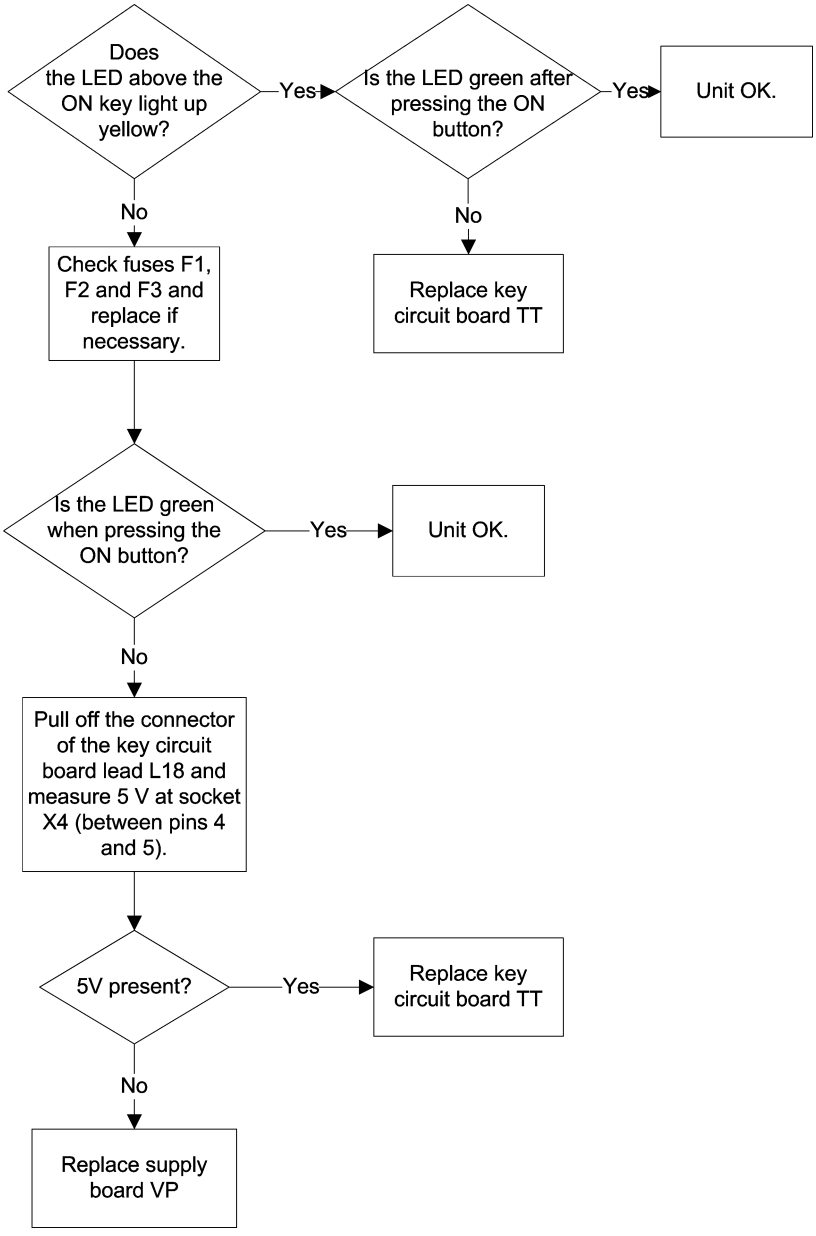
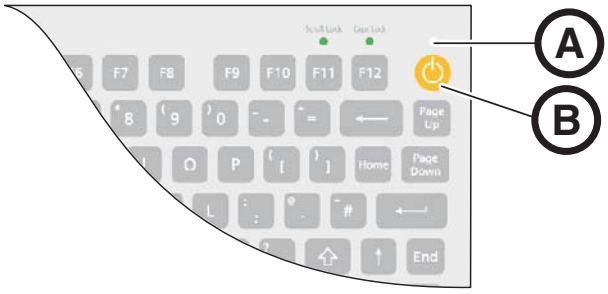
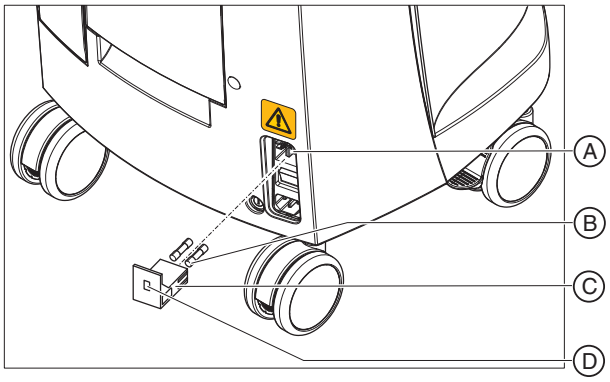

Does the LED above the ON key light up yellow?
Yes
Is the LED green after pressing the ON button?
Yes
Unit OK.
No
Check fuses F1, F2 and F3 and replace if necessary.
No
Replace key circuit board TT
Is the LED green when pressing the ON button?
Yes
Unit OK.
No
Pull off the connector of the key circuit board lead L18 and measure 5 V at socket X4 (between pins 4 and 5).
5V present?
Yes
Replace key circuit board TT
No
Replace supply board VP

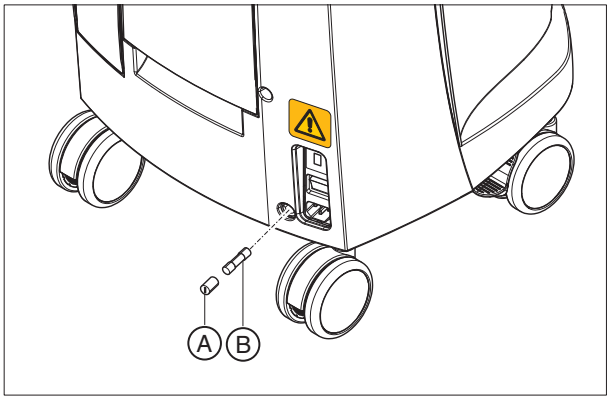


A	Ready LED		B	ON button



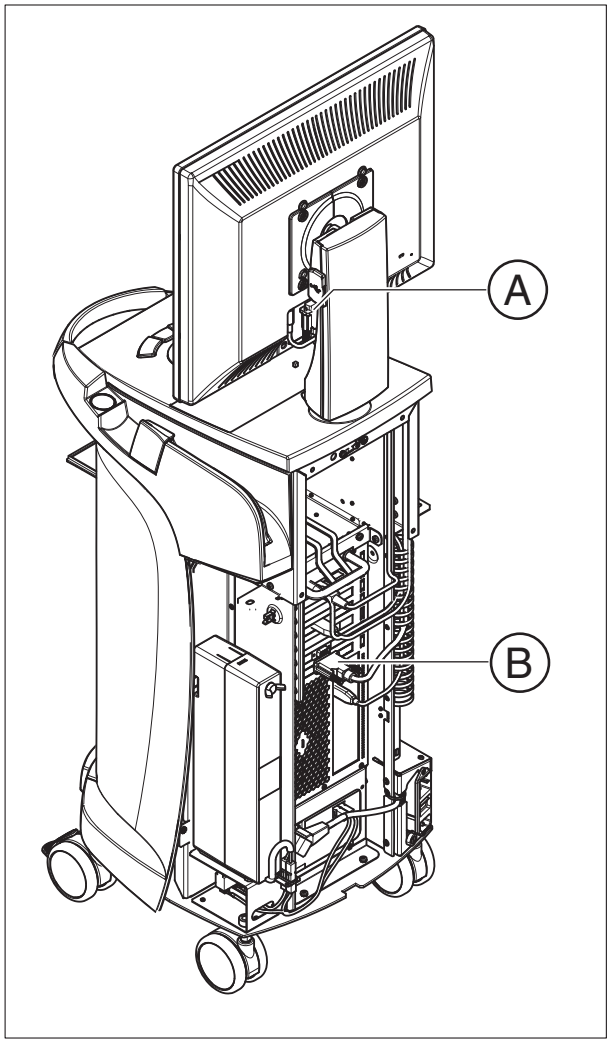
A	Voltage selection insert (only with CEREC Bluecam)		C	Fuse module
B	Main fuse		D	Window

Only with CEREC Bluecam



A	Fuse holder		B	Fuse

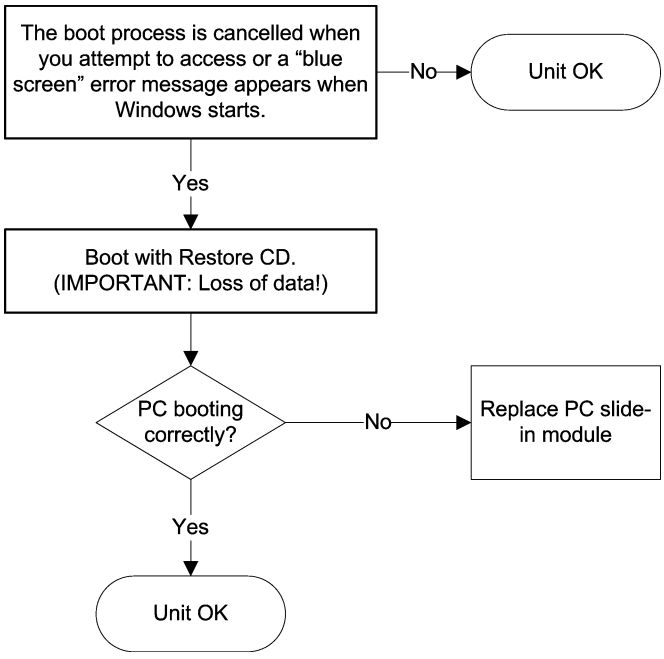
2.2 PC not booting correctly



A	DVI cable connected to monitor		B	DVI cable connected to PC

To start, check the following:

- Are the keyboard, trackball and DVI cable connected to the monitor on the PC slide-in module?
- Is the LED above the ON button **yellow** or **green**? See also System cannot be switched on [→ 8].

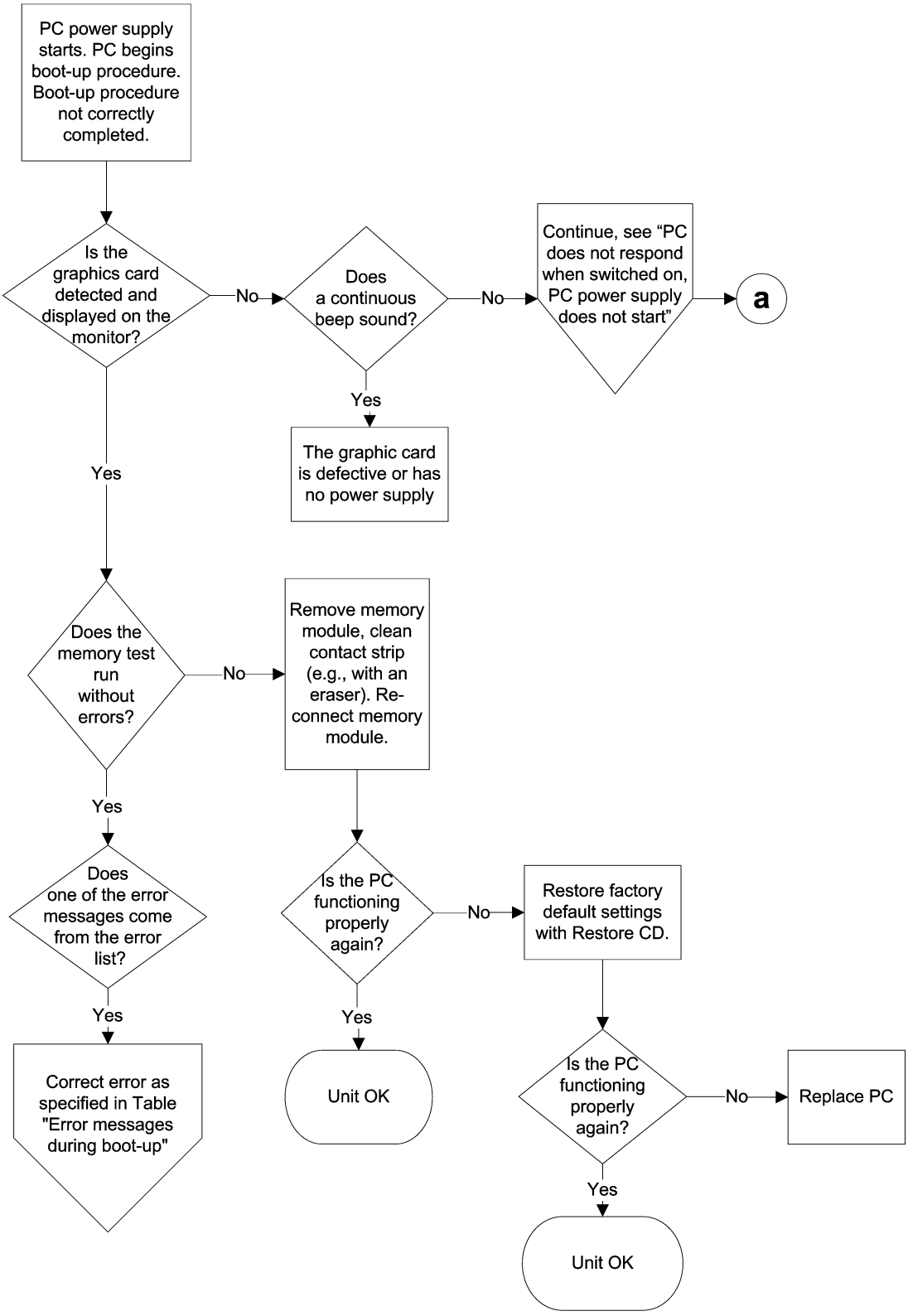


List of beep-tone error codes

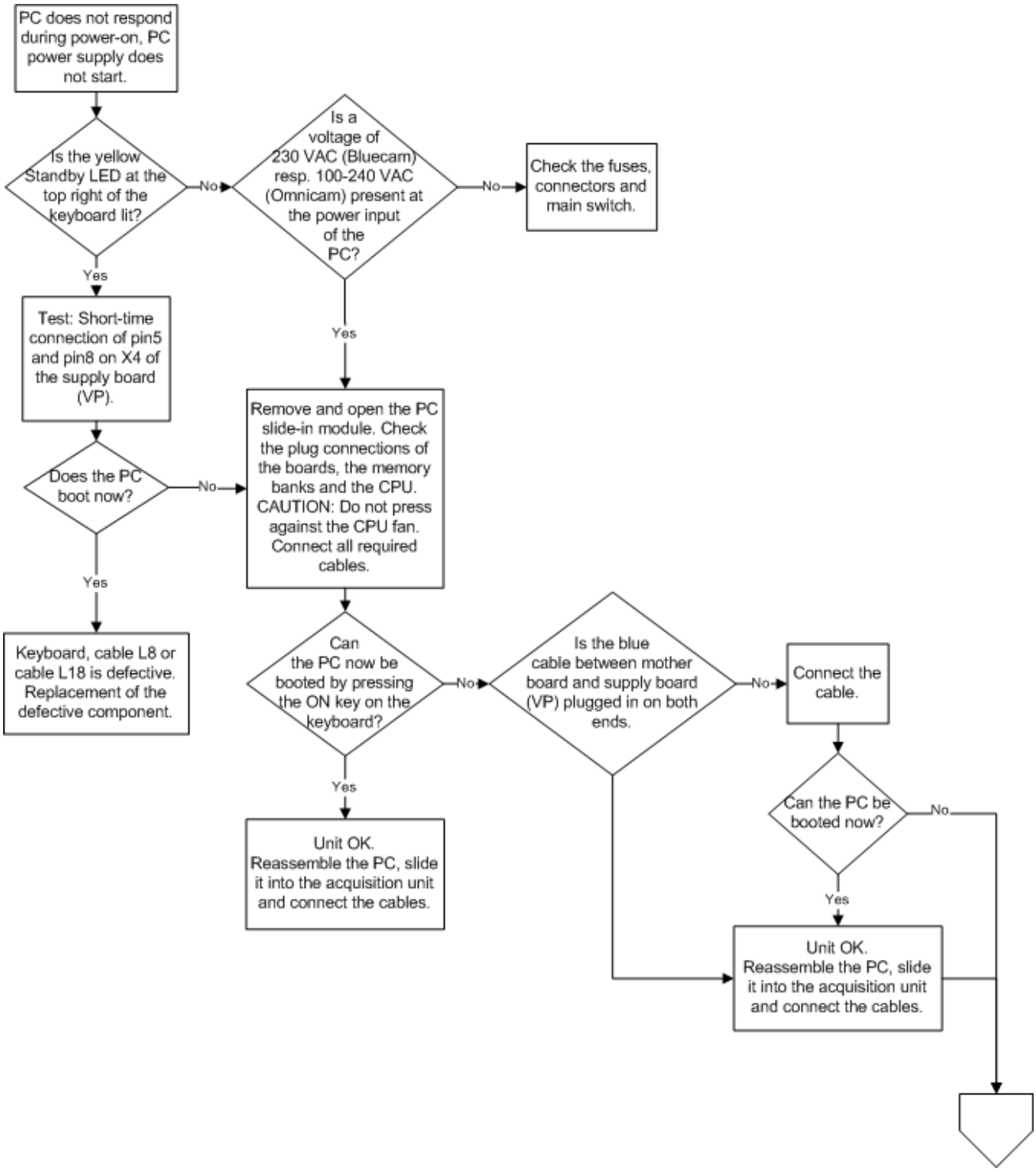
Beep tone sequence	Cause of error
permanent	The graphic card is defective or has no power supply

Error messages during boot-up and possible causes of errors:

Beep tone sequence	Cause of error
Disk Boot Failure, insert System Disk and press Enter.	If the primary master disk was not found: Check the data cable and voltage supply of the hard disk and the CD/ DVD drive.
Press a key to reboot.	Boot sector of hard disk cannot be found. Boot with Restore CD. If this fails, replace the PC.


PC power supply starts. PC begins boot-up procedure. Boot-up procedure not correctly completed.
Is the graphics card detected and displayed on the monitor?
No
Does a continuous beep sound?
No
Continue, see “PC does not respond when switched on, PC power supply does not start”
a
Yes
The graphic card is defective or has no power supply
Yes
Does the memory test run without errors?
No
Remove memory module, clean contact strip (e.g., with an eraser). Re-connect memory module.
Yes
Does one of the error messages come from the error list?
Is the PC functioning properly again?
No
Restore factory default settings with Restore CD.
Yes
Correct error as specified in Table "Error messages during boot-up"
Yes
Unit OK
Is the PC functioning properly again?
No
Replace PC
Yes
Unit OK

2.3 PC does not respond when switched on, PC power supply does not start



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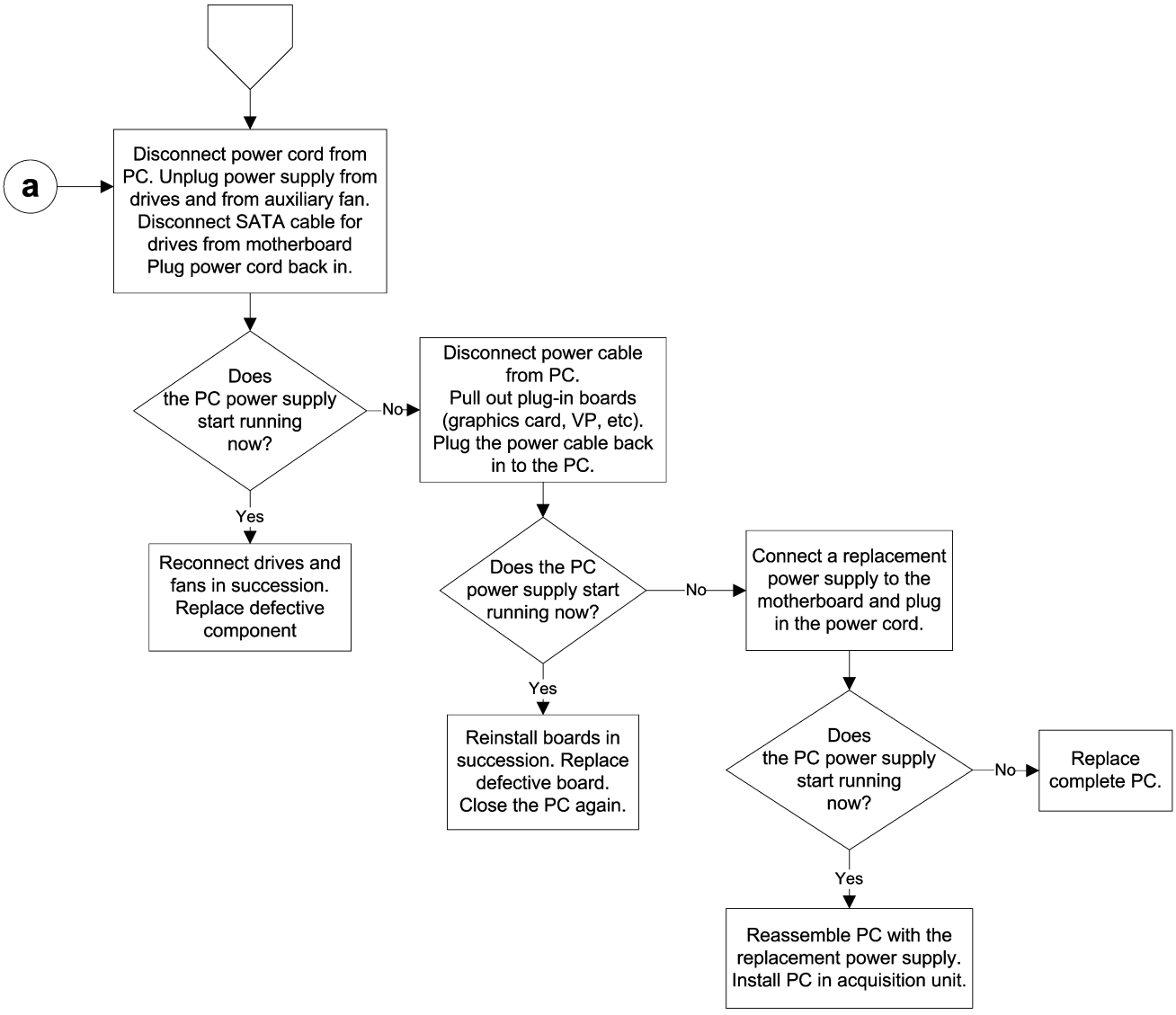
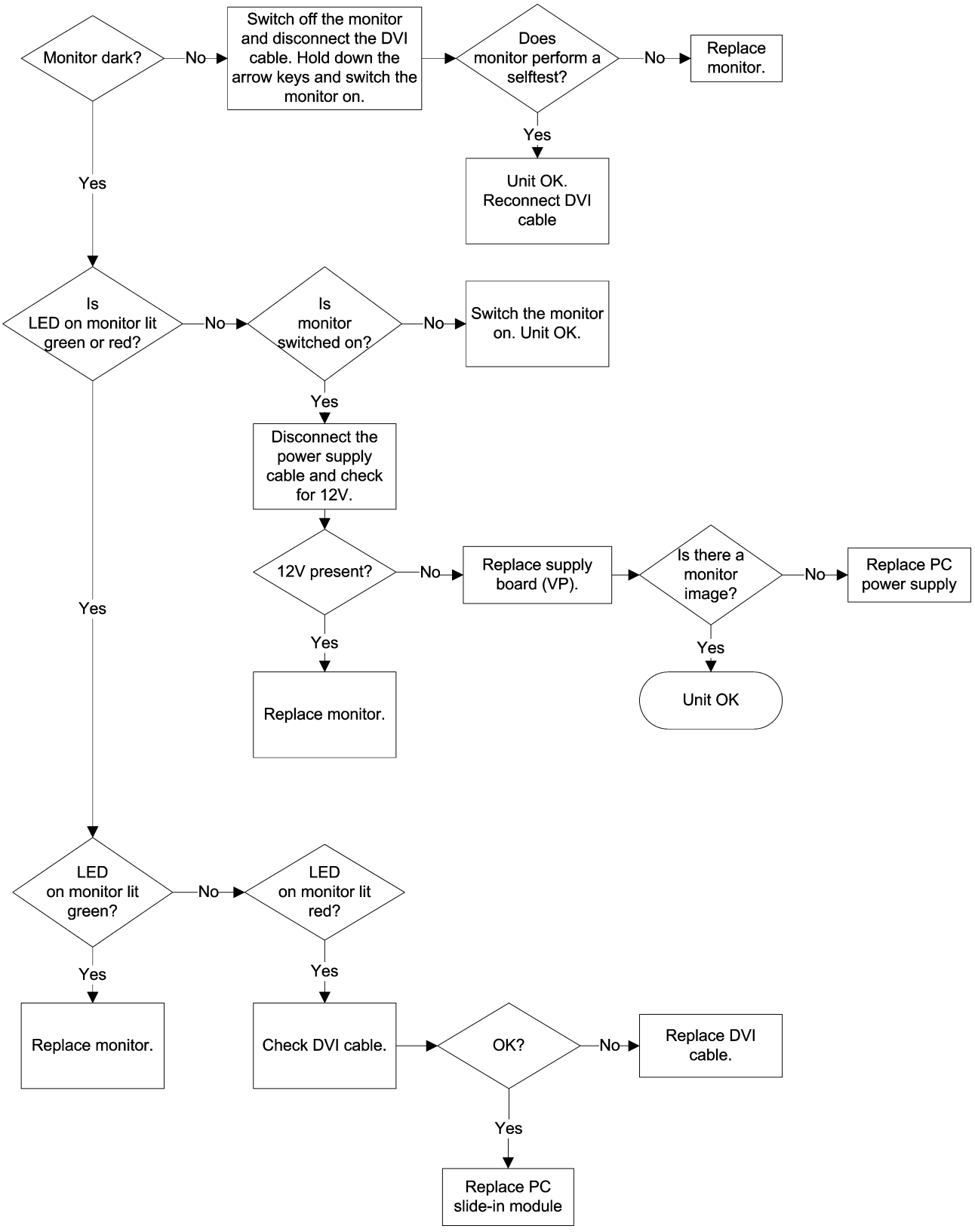


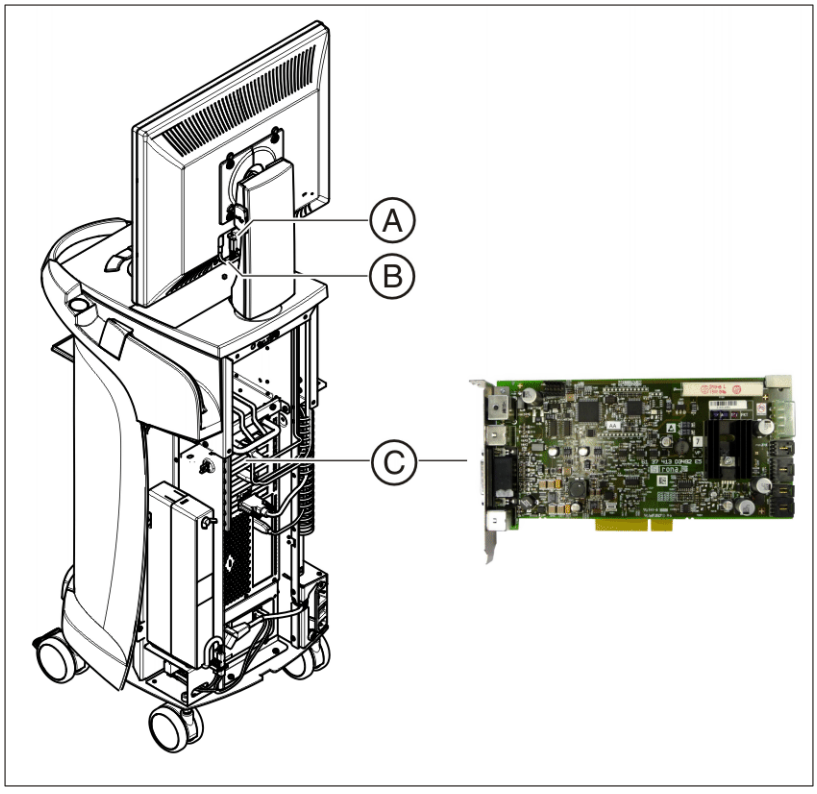
2.4 Other PC faults

Case of defect/fault	How to detect / action to take
COM port not functioning	Try replacing the wireless interface with a cable connection. If this fails, check whether the COM port is enabled in the BIOS. If it is, replace the PC.
No mouse pointer displayed on screen	Trackball defective or not connected.
No keyboard input possible	Keyboard (keyboard controller) defective or improperly connected. Check to make sure this fault is not due to bent plug contacts.

Case of defect/fault	How to detect / action to take
Network cannot be accessed	The upper LED at the network connection must be permanently lit green. If not: • The network cable between the network card and the hub / switch is defective. • Hub / switch defective (check whether other PCs connected to hub / switch can access the network). The "TX Data Act" LED flashes during data communication via the network.
CD-ROM / DVD-ROM missing in list of system drives (Explorer)	Data cable and/or voltage supply disconnected and/or defective. If this is the case, the drive is defective. Test via BIOS: It must be possible to select the drive.
No audio playback	Only a musical CD or only a wave file cannot be played back: • Check the software settings • Wrong sound card driver installed. • Cable between CD-ROM / DVD-ROM drive and sound card is loose or defective. • Defective CD-ROM / DVD-ROM drive

2.5 No monitor display





A	DVI cable connected to monitor		C	Supply board (VP)
B	Power supply cable connected to monitor			

2.6 Incorrect monitor display format size

To start, check the following:

- The screen resolution is not set higher than 1280 x 1024.
  Check this setting by clicking the desktop with the right trackball button and select *"Personalize"* | *"Display Settings"* | *"Monitor"*.

2.7 Monitor: Color depth/number of grayscales is insufficient

To start, check the following:

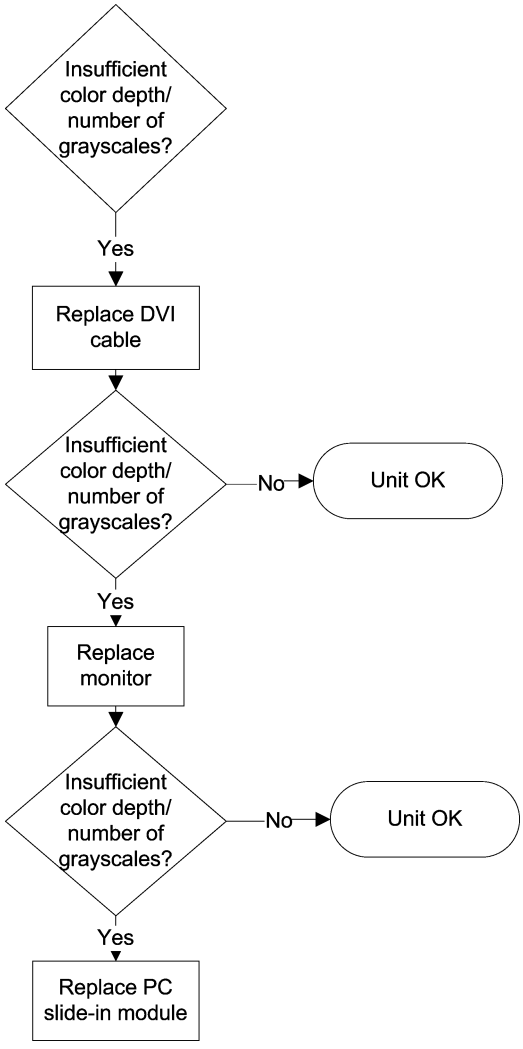
- The color depth setting must be 32 bit.
  Check the settings by clicking the desktop with the right trackball button and selecting *"Personalize"*| *"Display Settings"*| *"Monitor"*.
- Set the monitor brightness to 50% and the contrast to 60%.

Setting the contrast

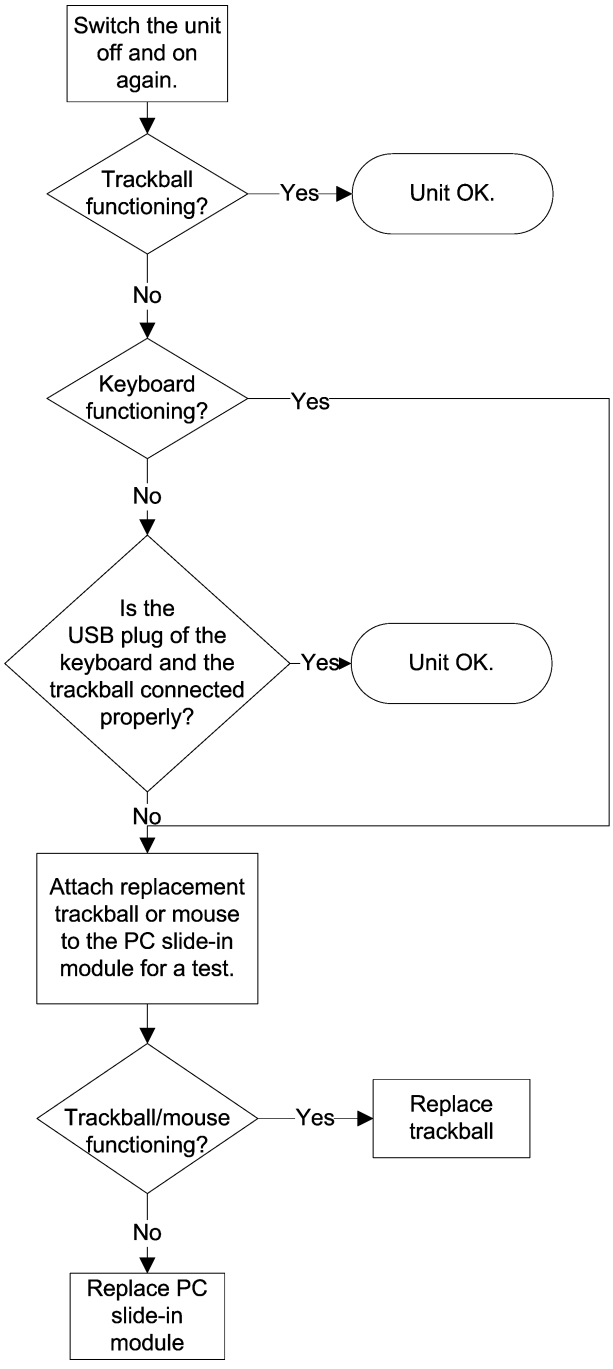
1. Click monitor key **M** once.
2. Change the contrast settings with the arrow keys.

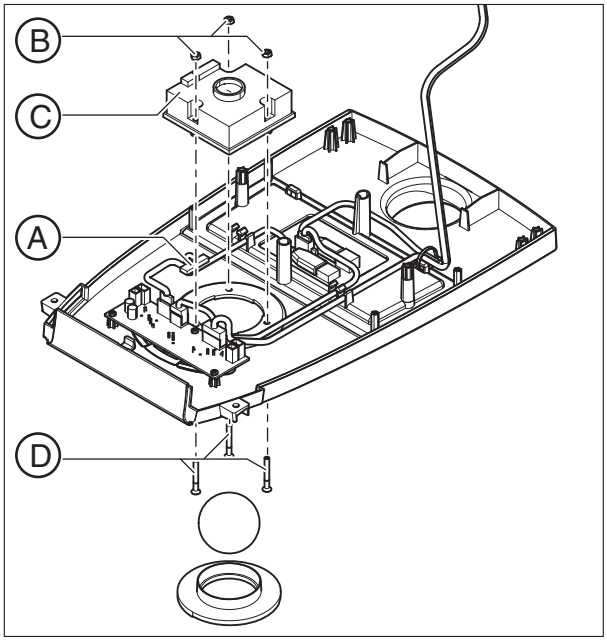
Setting the brightness

1. Click monitor key **M** once.
2. Click monitor key **S** once.
3. Change the brightness setting with the arrow keys.



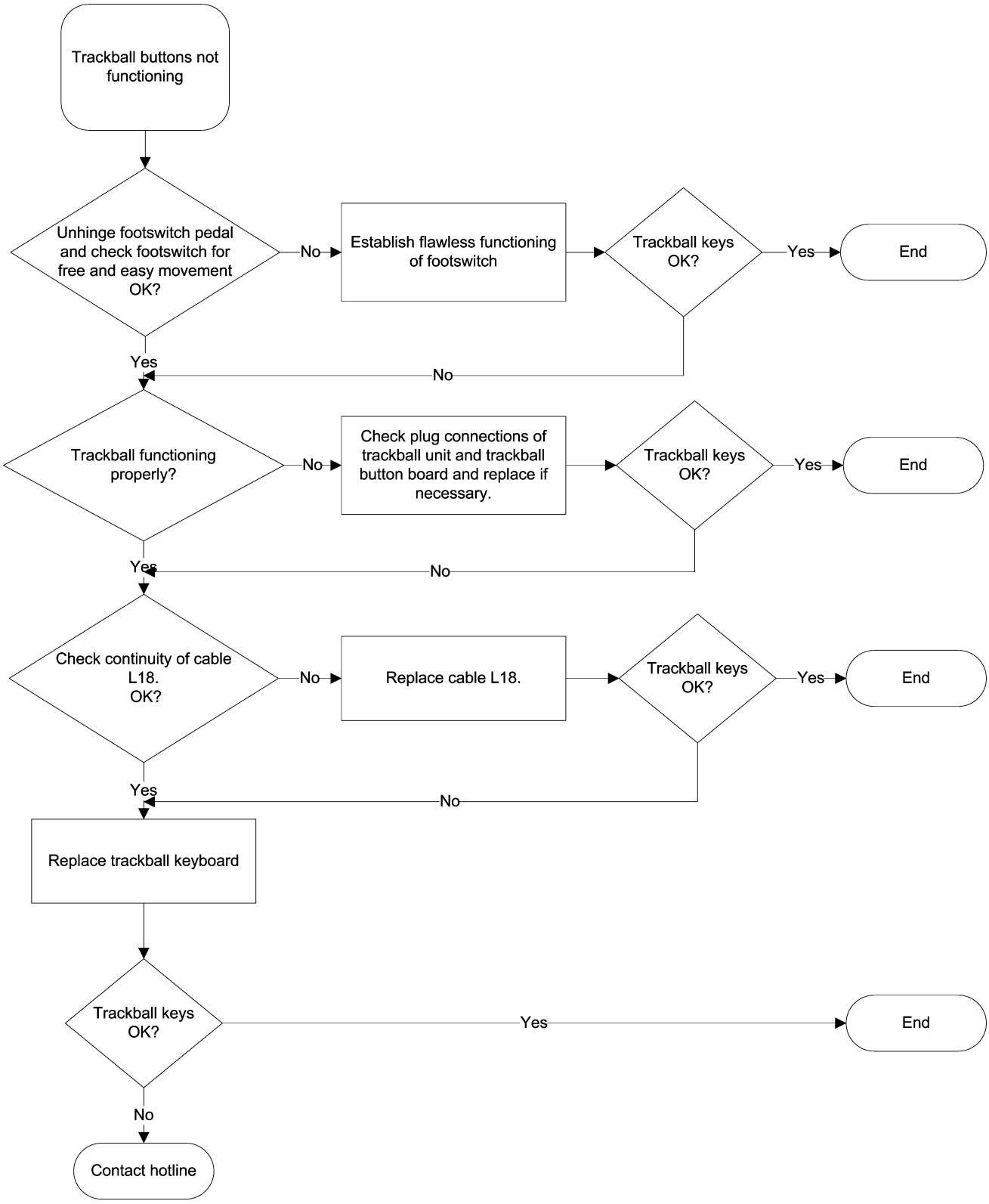
2.8 Trackball not functioning

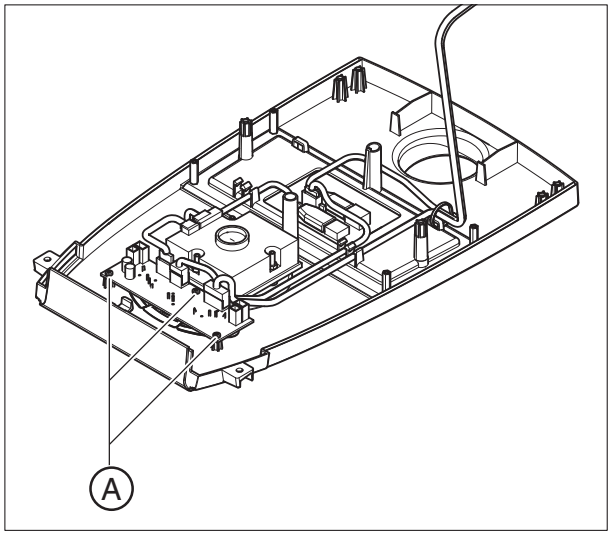




A	Trackball connection cable		C	Trackball
B	Three nuts		D	Three attachment screws

2.9 Trackball buttons not functioning



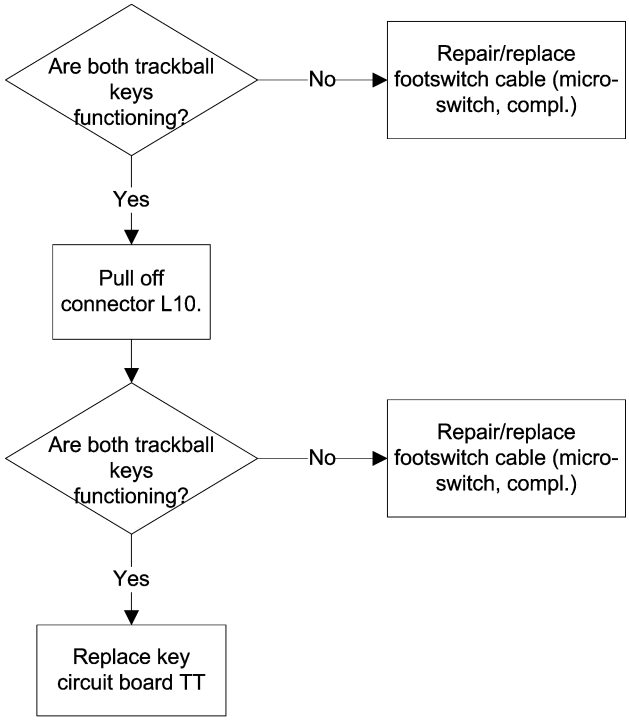


A	Three attachment screws

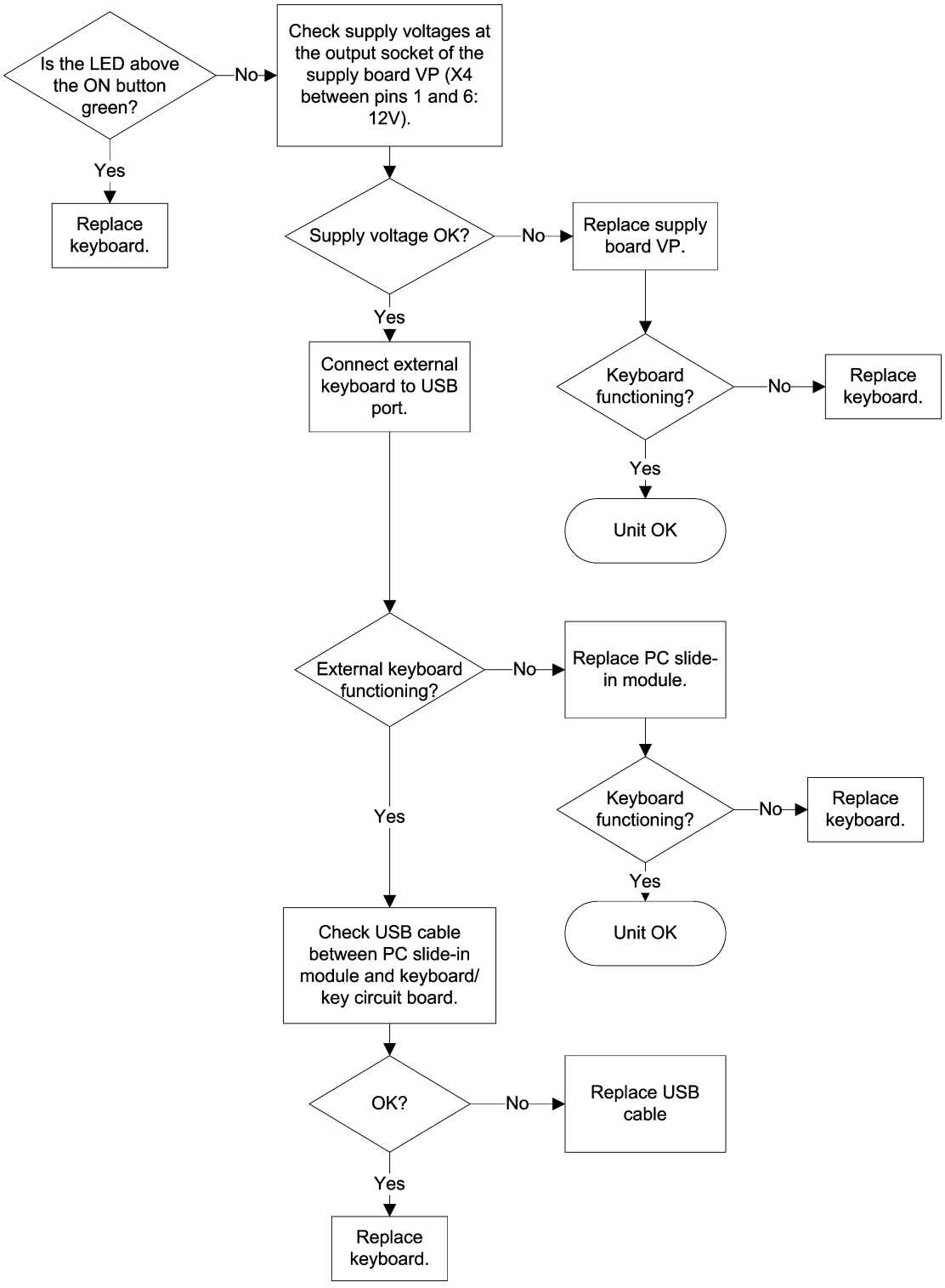
2.10 Footswitch not functioning

To start, check the following:

- See Section "Switching from right-hand to left-hand operation [→ 36]".
- Is the footswitch connector L10 properly plugged in?
- Is the footswitch mechanically obstructed?



2.11 Keyboard not functioning /defective



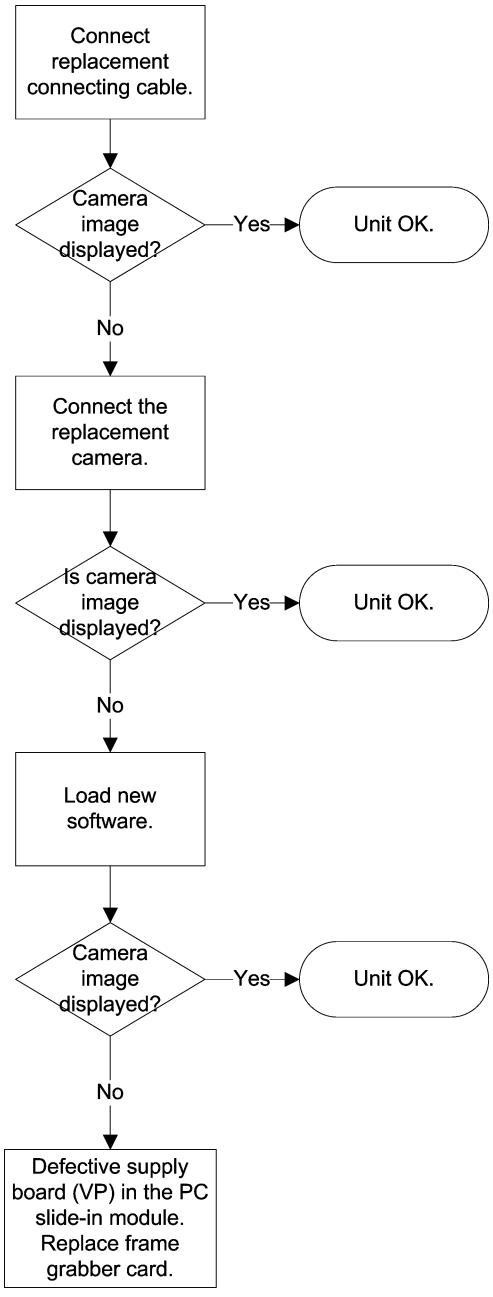
2.12 No camera image (Bluecam)

To start, check the following:

- In the Device Manager (*"Start"* | *"Control panel"* | *"Hardware and Sound"* | *"Device Manager"*), is the Bluecam listed as an image processing device? If yes, update the driver software.
- Is the camera cable properly connected to the camera and the supply board (VP) in the PC slide-in module?
- Check the connection cable between the supply board (VP) and the mainboard (motherboard).
- Does a CEREC 3D error message appear when the camera is supposed to be activated? If yes, load new software. If no camera image appears, replace the frame grabber card.

NOTICE

If you receive the message *"Unknown USB device"* after connecting the camera, reboot the computer.



2.13 No camera image (Omnicam)

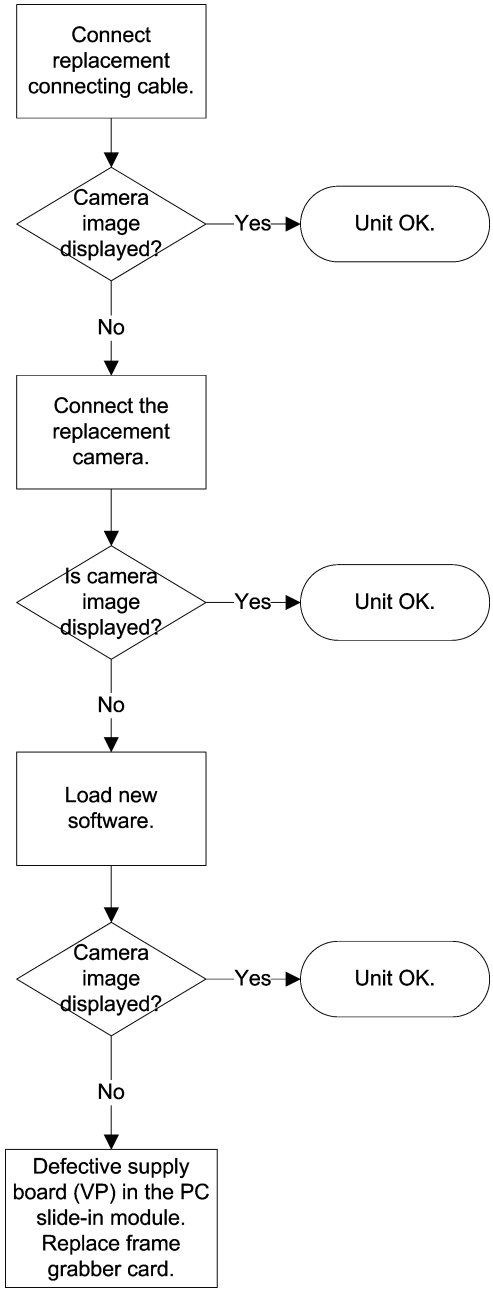
To start, check the following:

- In the Device Manager (*"Start"* | *"Control panel"* | *"Hardware and Sound"* | *"Device Manager"*), is the Omnicam listed as an image processing device? If yes, update the driver software.
- Is the camera cable properly connected to the second cable on the CEREC AC via the circular connector (LEMO connector)?
- Is the second CEREC AC cable properly connected to the supply board (VP) in the PC slide-in module?

- Check the connection cable between the supply board (VP) and the mainboard (motherboard).
- Does a CEREC 3D error message appear when the camera is supposed to be activated? If yes, load new software. If no camera image appears, replace the frame grabber card.

NOTICE

If you receive the message *"Unknown USB device"* after connecting the camera, reboot the computer.



Disconnecting the camera cable from the Omnicam

The Omnicam camera cable has two parts. The first camera cable is attached to the Omnicam and with it forms a unit.

In the event of a claim, the customer sends the Omnicam and the cable as a unit to Sirona customer support.

1. Disconnect the slotted round nut with the extraction tool. Guide the extraction tool over the cable.
   ↳ The camera housing and the adapter ring are released. The cable grip cover is exposed.
2. Unscrew the 2-way screwed connection of the cable grip cover with a TORX screwdriver (08x60).
   ↳ The stainless steel sleeve and the connector are easily accessible.
3. Pull the connector out of the Omnicam and disconnect it.
   ↳ The cable is unplugged from the Omnicam.

To re-establish the connection between the Omnicam and the cable, carry out the steps listed above in reverse order. Ensure that the stainless steel sleeve and the anti-kink sleeve fit together well and that the same applies for the camera injection mold.

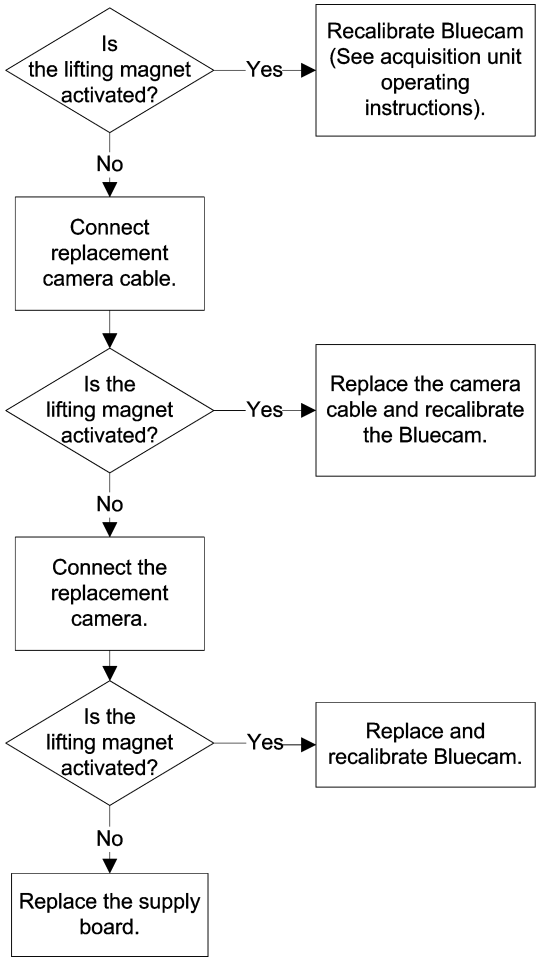
2.14 Incorrectly adjusted optical impression (Bluecam)

Check whether the lifting magnet in the 3D camera is briefly activated during the measuring phase. A clicking sound should be heard.

NOTICE

Shaking during optical impression

Badly adjusted optical impressions may be due to shaking of the camera. The stored optical impression may be OK despite shaking of the camera.



2.15 Error messages during camera calibration (Bluecam)

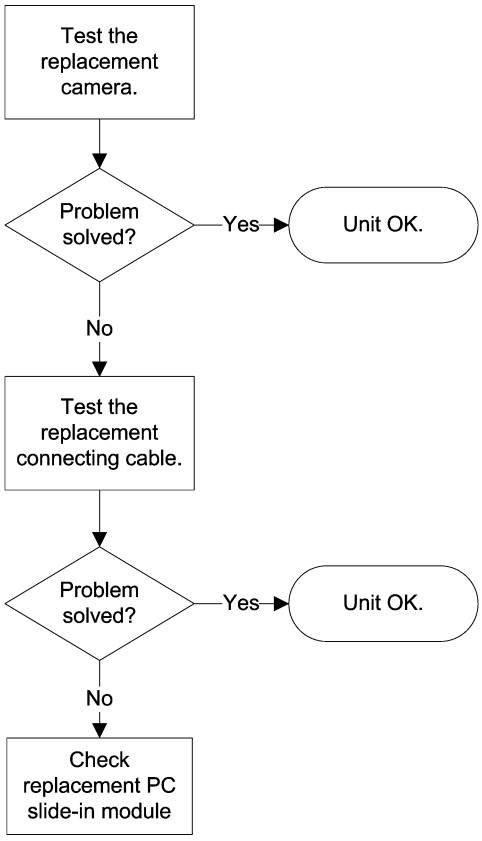
There are two classes of error messages which can occur during camera calibration:

- Class 1 are warnings which should be treated seriously. It is possible to temporarily accept these errors by selecting *"OK"* and then continue with the calibration process.
- Class 3 are errors which force the calibration process to stop without the calibration data being saved.

The texts of the error messages give instructions on what to do. Observe the following:

- Prepare the calibration set properly.
- Slide the calibration set up to the stop.
- Ensure that the camera is kept clean (see acquisition unit operating instructions and Bluecam calibration instructions).

If the message "Image size too small" is displayed, try to reposition the prism tube in relation to the camera in order to avoid any possible image loss.

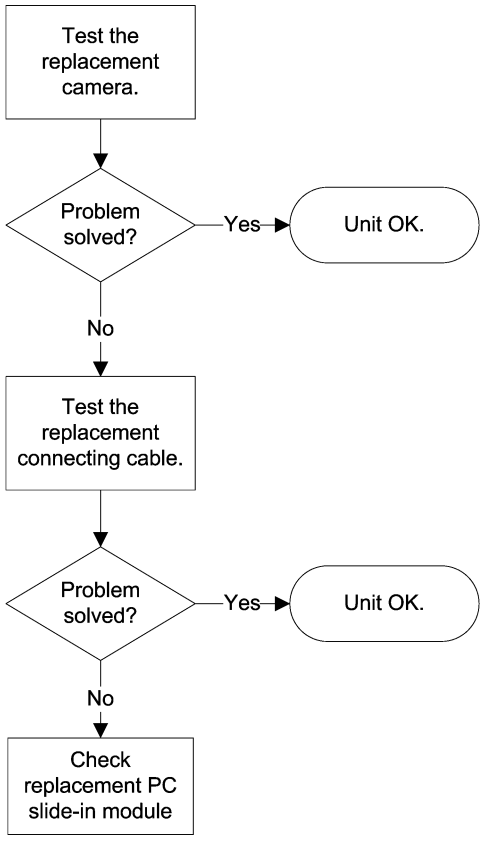


2.16 Error messages during camera calibration (Omnicam)

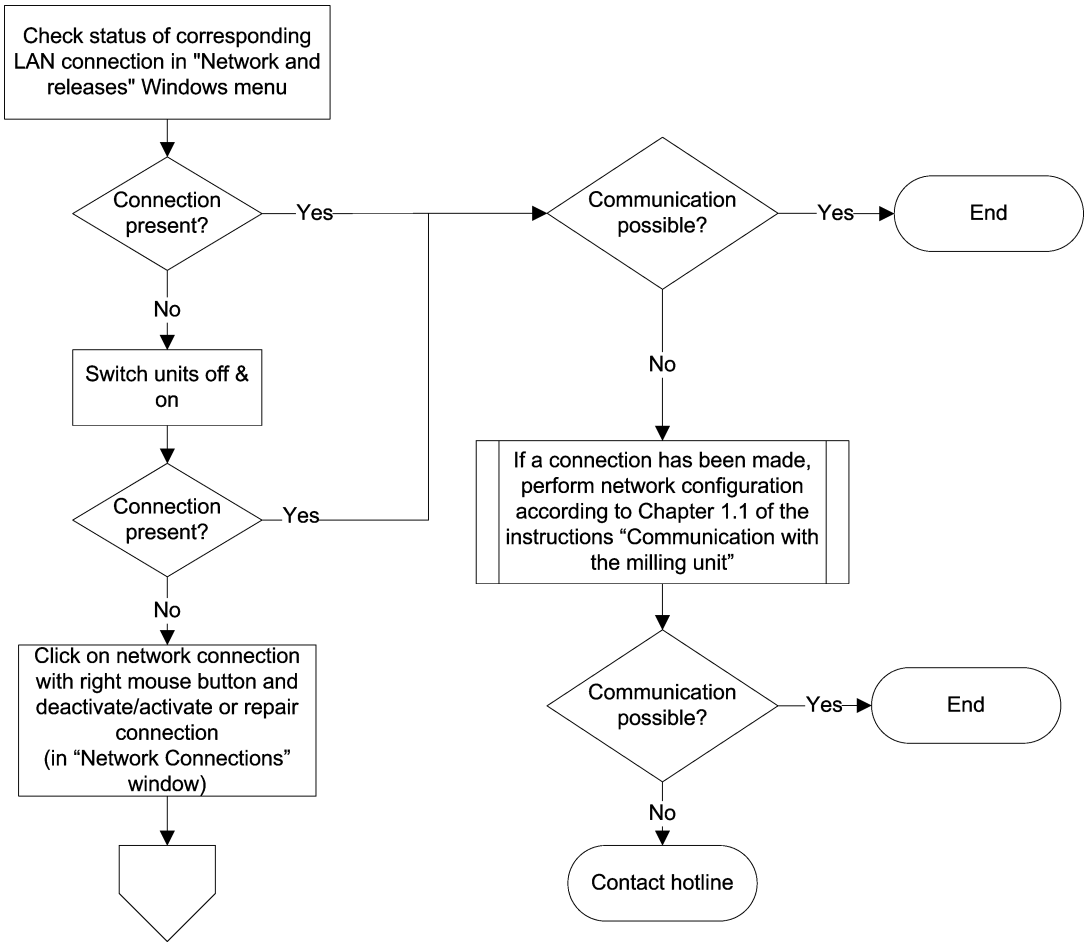
When calibrating the Omnicam, follow the instructions in the CEREC AC Operating Instructions. This also includes the error messages.

Ensure that the protective cover is replaced after using the calibration set so as to prevent the camera from being contaminated.

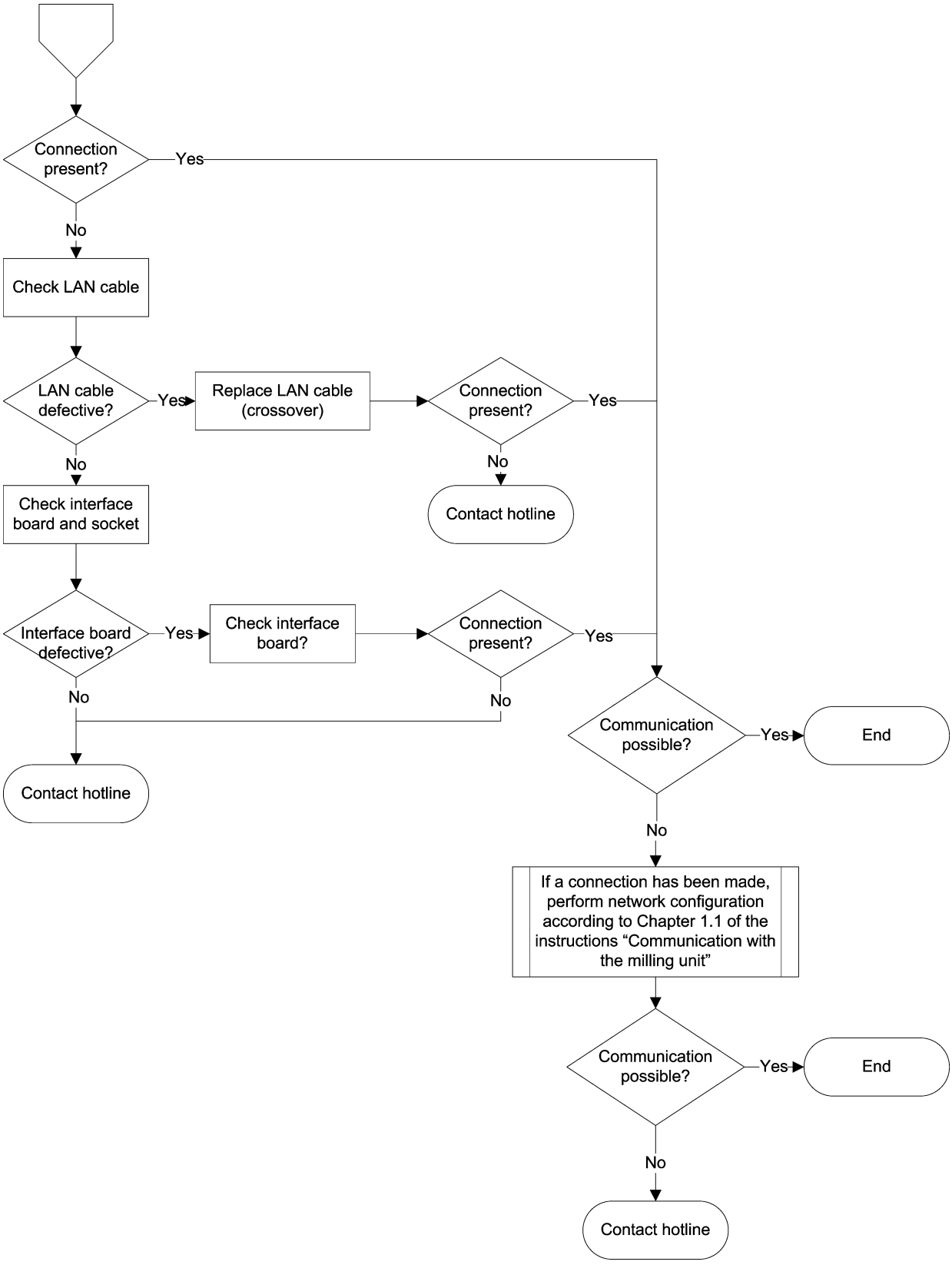
If a calibration is repeatedly unsuccessful, replace the calibration set.


Test the replacement camera.
Problem solved?
Yes
Unit OK.
No
Test the replacement connecting cable.
Problem solved?
Yes
Unit OK.
No
Check replacement PC slide-in module

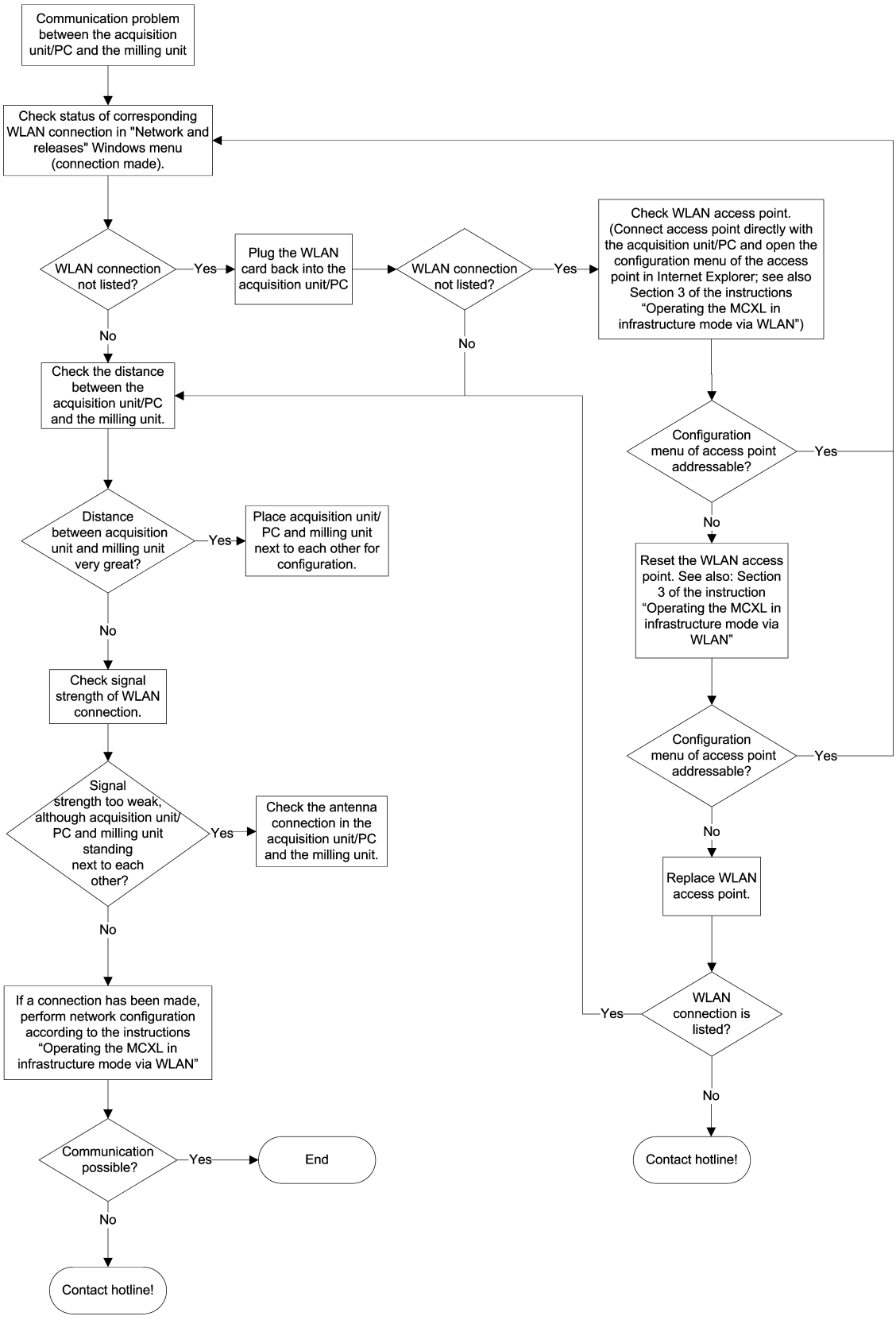
2.17 LAN communication problems



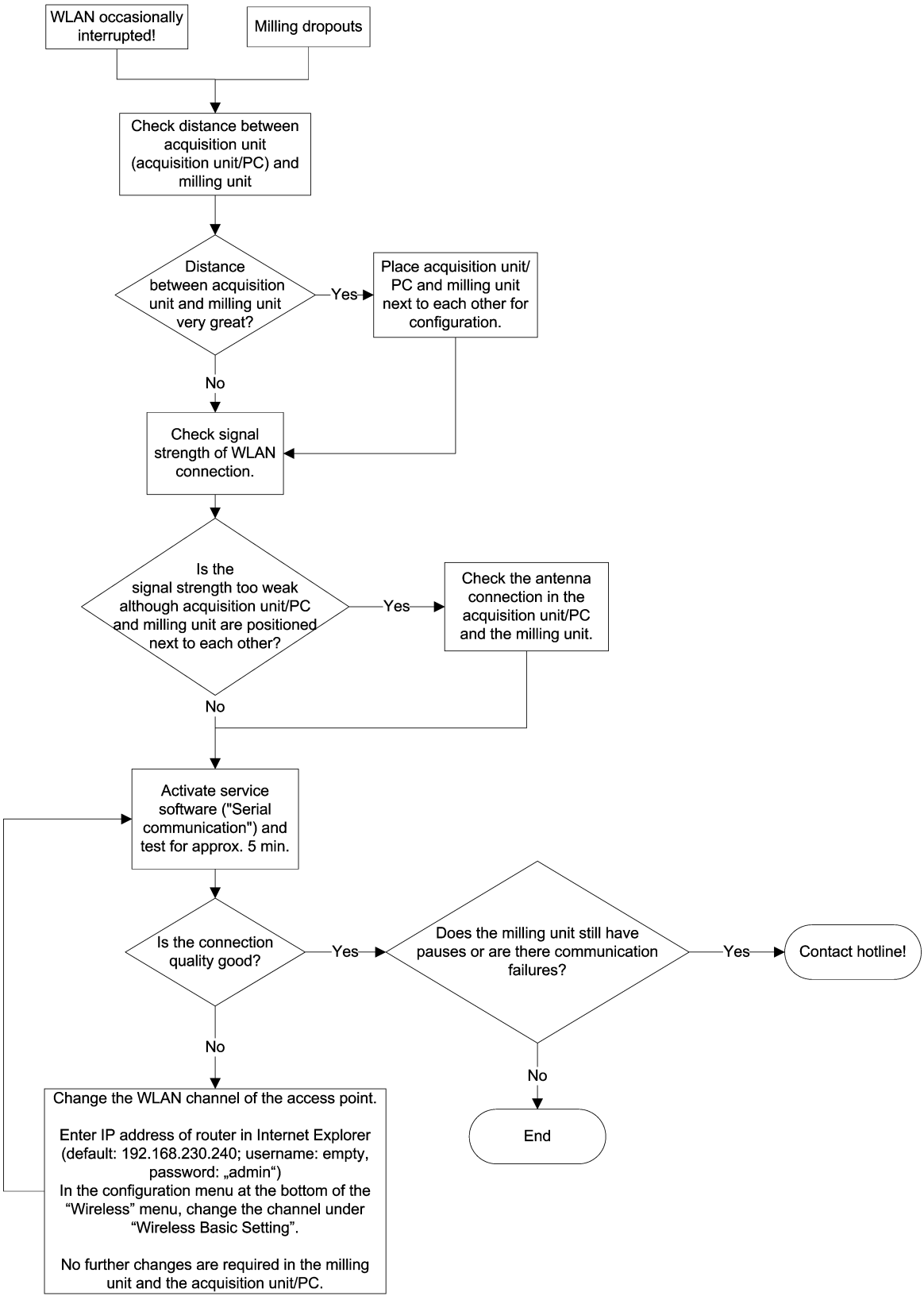
See next page.


Connection present?
Yes
No
Check LAN cable
LAN cable defective?
Yes
Replace LAN cable (crossover)
Connection present?
Yes
No
Contact hotline
No
Check interface board and socket
Interface board defective?
Yes
Check interface board?
Connection present?
Yes
No
No
Contact hotline
Communication possible?
Yes
End
No
If a connection has been made, perform network configuration according to Chapter 1.1 of the instructions “Communication with the milling unit”
Communication possible?
Yes
End
No
Contact hotline

2.18 WLAN communication problems

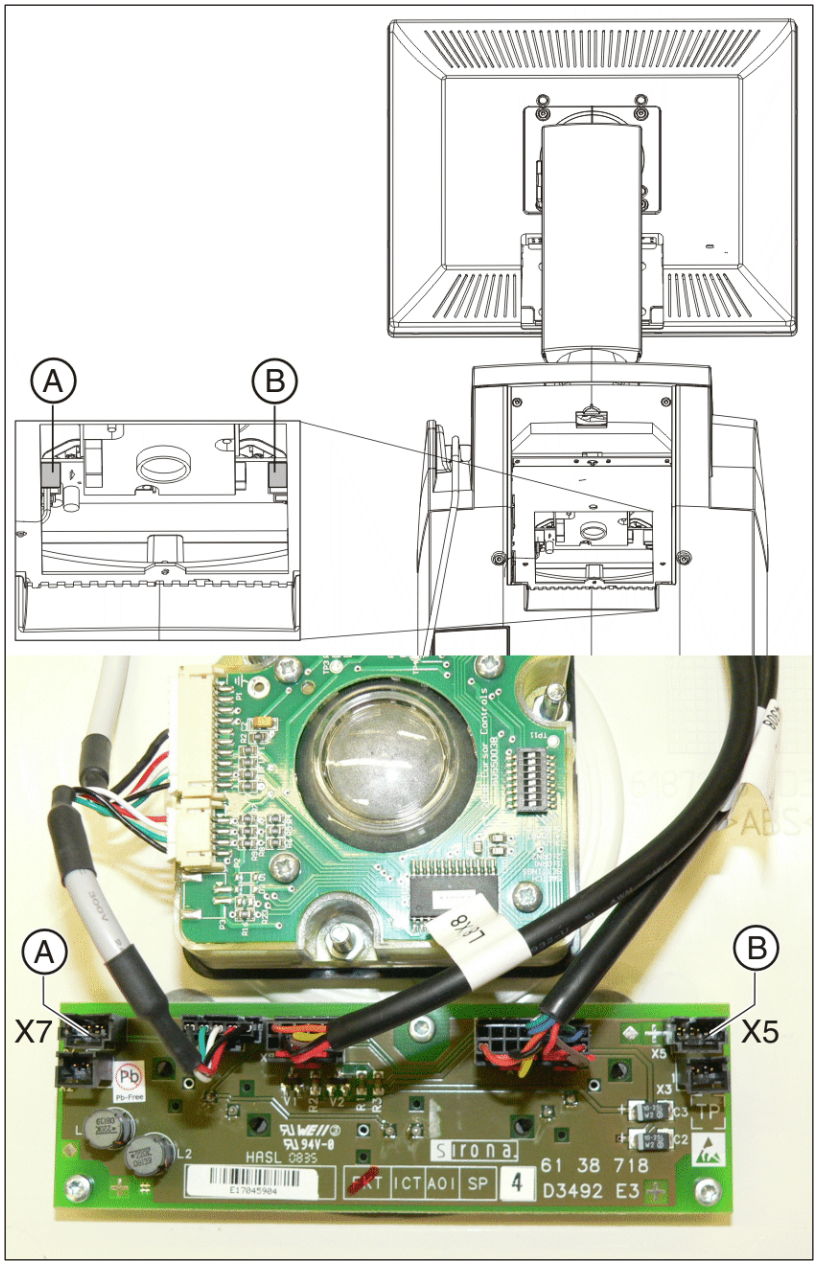


2.19 WLAN occasionally interrupted



3 Settings

3.1 Changing from right-handed to left-handed operation



In the factory default setting, the left button trackball button corresponds to a foot control entry. If you would like to change this assignment to the right trackball button (e.g..: for left-handed people), perform the following steps.

1. Open the upper cover on the rear side.

NOTICE
Opening the latch Use a coin to open the latch. Turn counterclockwise.

2. Pull the plug out of socket **A** (X7) and plug it into the free socket **B** (X5).
3. Close the cover.

The software changeover from **right-handed** to **left-handed** operation is described in the Windows help function (F1, mouse buttons, swap).

4 Repair

4.1 General information on assembly

⚠ DANGER

Potentially lethal shock hazard

People can be injured or electrical components of the unit destroyed.

➢ Switch off the unit **prior** to beginning work.

➢ Pull out the power cable.

NOTICE

Accessories

For reasons of product safety, this product may be operated only with original Sirona accessories or third-party accessories expressly approved by Sirona. The user is responsible for any damage resulting from the use of non-approved accessories.

NOTICE

Observe the order of tightening screws here.

Always start in the front at the handle and then tighten the screws towards the back or bottom.

NOTICE

If cable is kinked or twisted.

Kinking or twisting can cause the wires in the cable to break. The cable must be replaced.

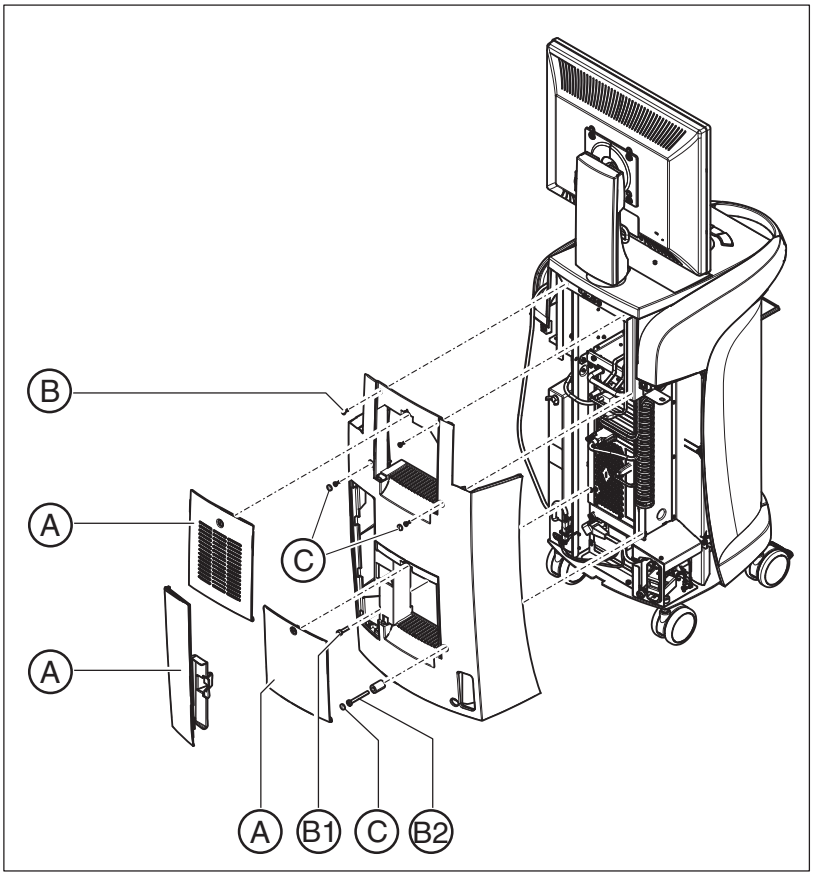
➢ Ensure that electrical lines do not become kinked or twisted.

4.2 Covers

4.2.1 Removing and inserting the back panel

Installation kit	Order no.
Bluecam back panel	62 36 215
Omnicam back panel	63 99 328

Removal



1. Open the doors **A** on the back panel.

NOTICE

Open with coin.

Use a coin to open the latch. Turn counterclockwise.

2. Remove the battery (if present).
3. Remove the three screw caps **(C)** from the back panel.
4. Remove the six screws **(B)** from the back panel.
5. Pull the back panel off of the unit.

Installation

NOTICE

Different screw lengths.

Please note that the longer screws **B1** and **B2** are intended for use on the lower part of the back panel. See the illustration for the precise order.

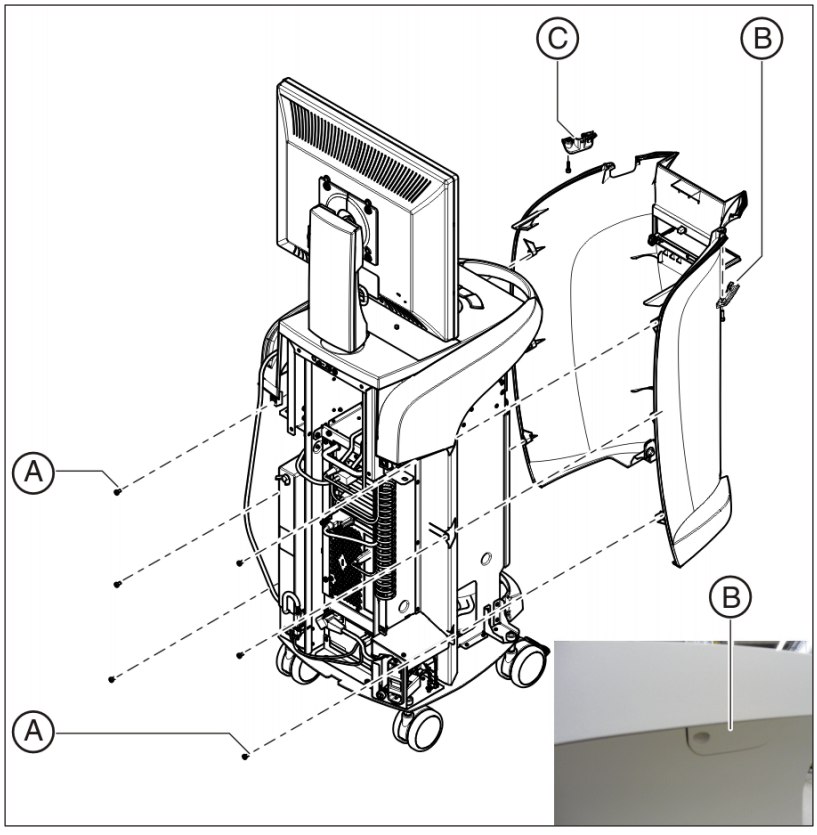
1. Fasten the back panel to the acquisition unit with the six screws **(B)**. Pay attention to the order of the screws.
2. Insert the three screw caps **(C)** onto the back panel shown.
3. Insert the battery (if present).
4. Close the doors **(A)** on the back panel.

4.2.2 Removing and inserting the front panel

Installation kit	Order No.
Front panel, compl.	62 35 969

Removal

✓ The back panel is fully removed, see Removing and inserting the back panel [→ 39].



1. Flip the footswitch down.
2. Loosen the screws of the cover **(B)** and the camera cable fastener **(C)**.

3. Remove the three screws **(A)** on each side.
4. Pull the front panel forwards and remove the cover.

Installation

1. Slide the front panel onto the acquisition unit.
2. Position the cover **(B)** and the camera cable fastener **(C)** and fasten each of them with a screw.
3. Fasten the front panel with three screws **(A)** on each side of the acquisition unit.
4. Flip the footswitch up.

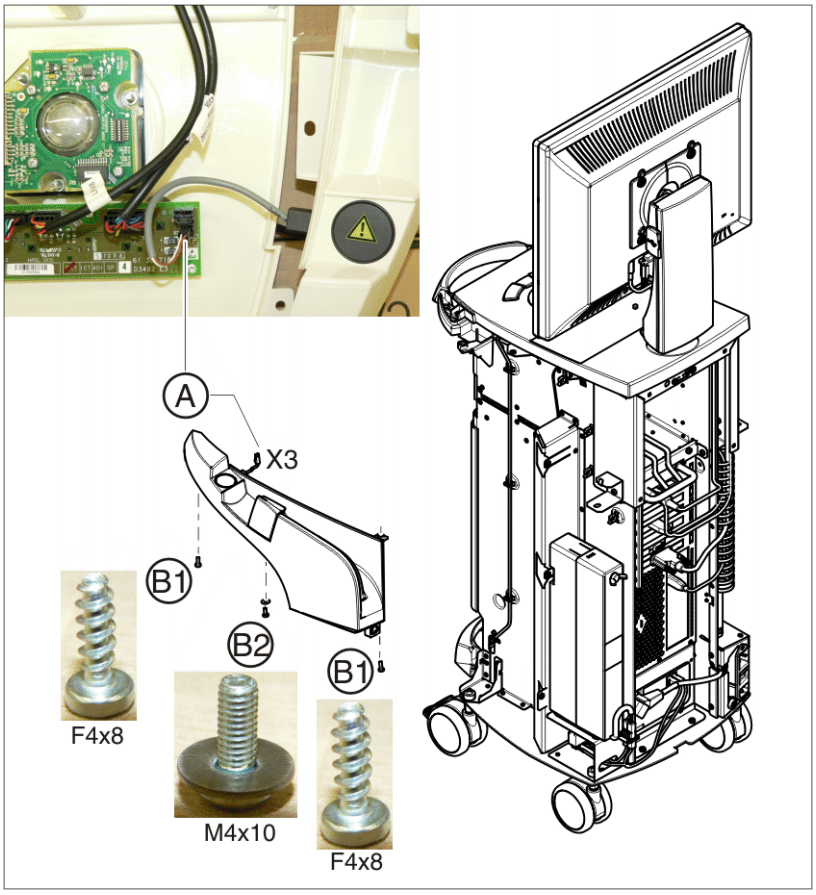
4.2.3 Replacing the camera holder

Installation kit	Order no.
Right camera holder, compl.	62 36 280

✓ The back panel is fully removed, see Removing and inserting the back panel [→ 39].

✓ The front panel is fully removed, see Removing and inserting the front panel [→ 40].

1. 1. Unscrew the camera from the camera cable (or disconnect the camera cable on the CEREC Omnicam from the CEREC AC cable) and remove the camera.



2. Pull the cable **(A)** of the heater off of the board (X3).

NOTICE

Pay attention to the screw threads when removing and re-inserting the screws. The middle screw **(B2)** is an M4x10 machine screw; the other two screws **(B1)** are self-tapping screws.

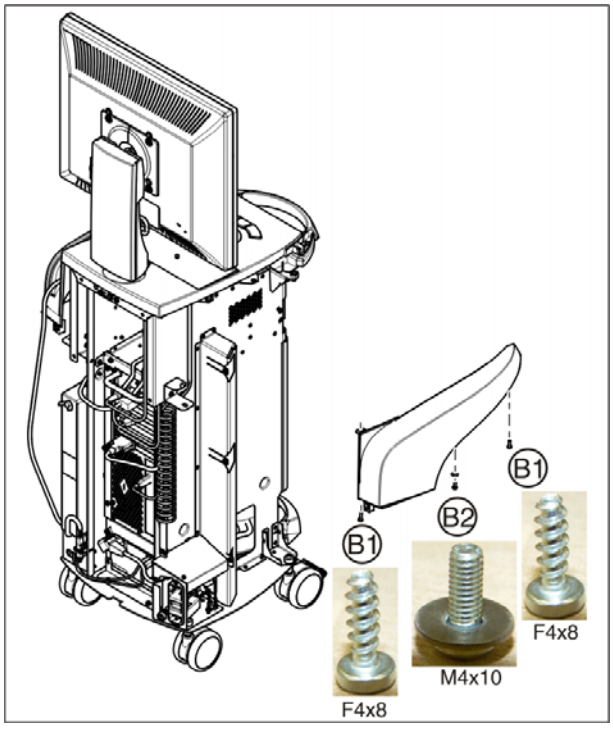
3. Remove the three screws **(B)** of the camera holder. Be careful not to lose the washer of the middle screw.
4. Remove the camera holder from the device sideways.
5. Hold the new camera holder against the stop at the front and twist in the rear half until the camera holder is seated flush. The camera cable has to be inserted through the opening intended for this purpose.
6. Fasten the camera holder securely by tightening the three screws **(B)**. Use the washer for the middle screw **(B2)**.

4.2.4 Replacing the upper side cover

Installation kit	Order no.
Left upper side cover	62 36 272

✓ The back panel is fully removed, see Removing and inserting the back panel [→ 39].

✓ The front panel is fully removed, see Removing and inserting the front panel [→ 40].



NOTICE

Pay attention to the screw threads when removing and re-inserting the screws. The middle screw **(B2)** is an M4x10 machine screw; the other two screws **(B1)** are self-tapping screws.

1. Remove the three screws **(B)** of the upper side cover. Be careful not to lose the washer of the middle screw.
2. Remove the upper side cover from the unit sideways.
3. Hold the new upper side cover against the stop at the front and twist in the rear half in until the upper side cover is flush.
4. Attach the upper side cover using three screws **(B)**. Use the washer for the middle screw **(B2)**.

4.3 Electrical and electromechanical components

4.3.1 Monitor

4.3.1.1 Replacing the LCD monitor

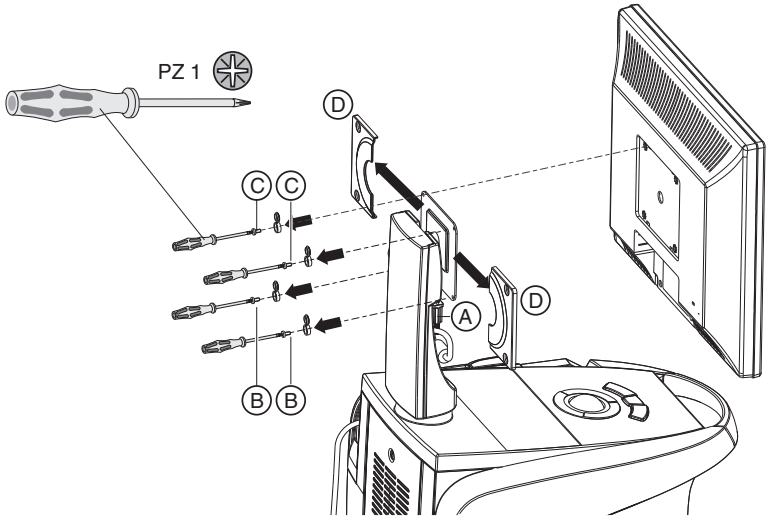
Installation kit	Order No.
LCD monitor	62 35 951

NOTICE

Risk of damage to the display caused by mechanical impact.

➢ Do NOT subject active display area to any mechanical pressure.
➢ NEVER touch active display area with sharp or pointed objects.

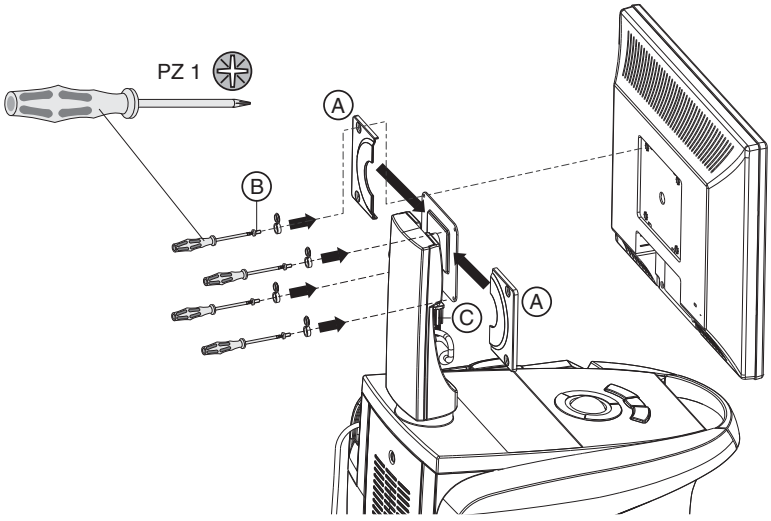
Removing the monitor



1. Tilt the tilt joint back.
2. Remove the DVI plug **(A)** and the voltage supply plug from the monitor.
3. Open the screw cover if needed with a flat-head screwdriver. Hold the monitor and remove the lower screws first **(B)**, then remove the two upper screws **(C)**. Make sure that the covers **(D)** don't fall down.
4. Remove the screws **(B)** and **(C)** along with the screw covers and the housing covers **(D)**.

5. Remove the monitor from the tilt joint.

Mounting the monitor



1. Place the new monitor on the tilt joint and temporarily tighten the top left screw **(B)** fully to secure it.
2. Place the right cover **(A)** on and tighten the monitor with 2 screws and screw covers.
3. Remove the screw **(B)**, attach the left cover **(A)** and fasten the monitor with 2 screws and screw covers.
4. Close the screw covers.
5. Plug in the DVI plug **(C)** and screw it tight.
6. Connect the power supply plug.

4.3.1.2 Replacing the tilt joint

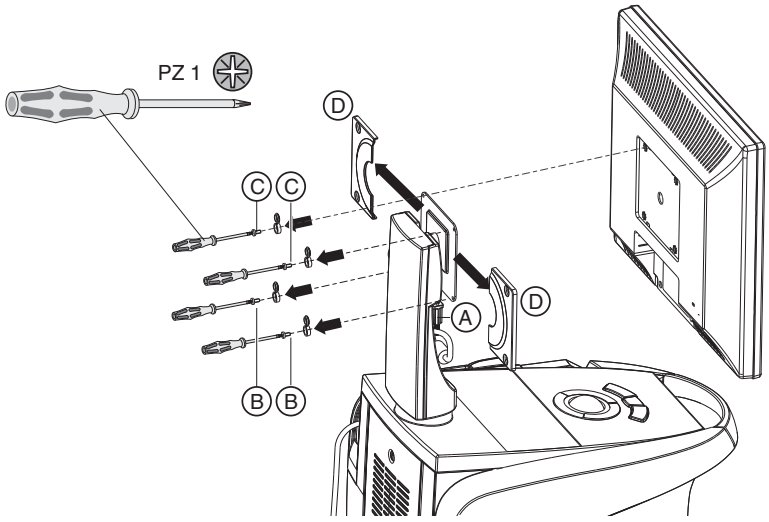
Installation kit	Order No.
Monitor tilt joint replacement	62 35 894

NOTICE

Risk of damage to the display caused by mechanical impact.

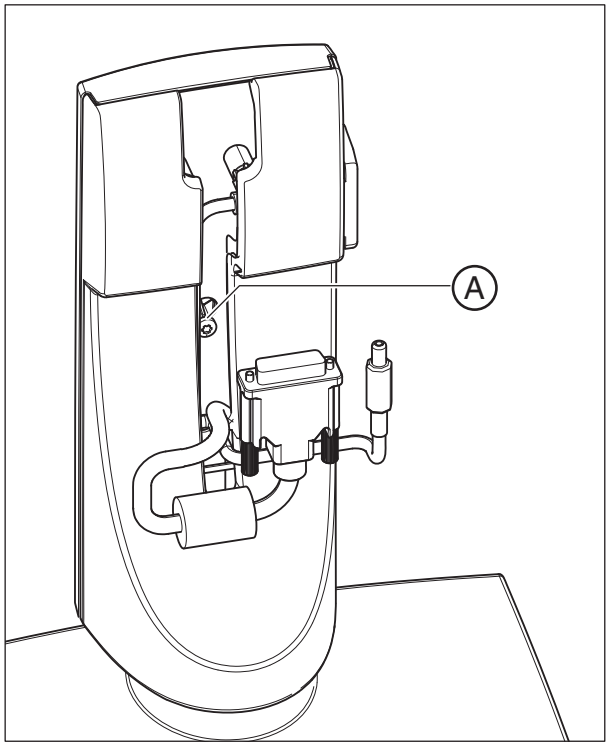
➢ Do NOT subject active display area to any mechanical pressure.
➢ NEVER touch active display area with sharp or pointed objects.

Removing the monitor

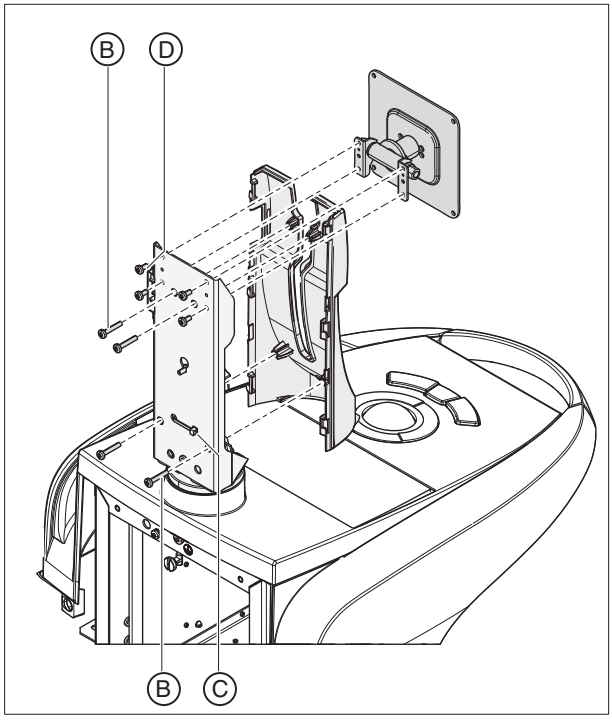


1. Tilt the tilt joint back.
2. Remove the DVI plug **(A)** and the voltage supply plug from the monitor.
3. Open the screw cover if needed with a flat-head screwdriver. Hold the monitor and remove the lower screws first **(B)**, then remove the two upper screws **(C)**. Make sure that the covers **(D)** don't fall down.
4. Remove the screws **(B)** and **(C)** along with the screw covers and the housing covers **(D)**.
5. Remove the monitor from the tilt joint.

Removing the tilt joint



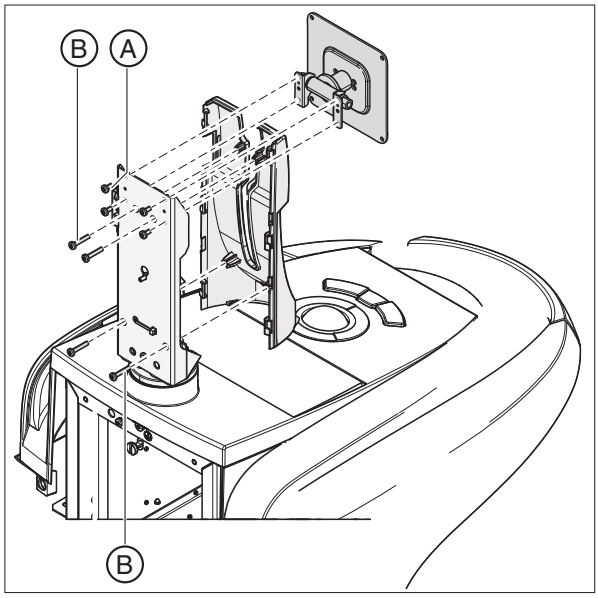
1. Loosen the screw **(A)** of the back cover from the front.
2. Lift off the back cover and remove it.



3. Remove the screws **(B)** of the front cover.
4. Remove the cable tie **(C)**.

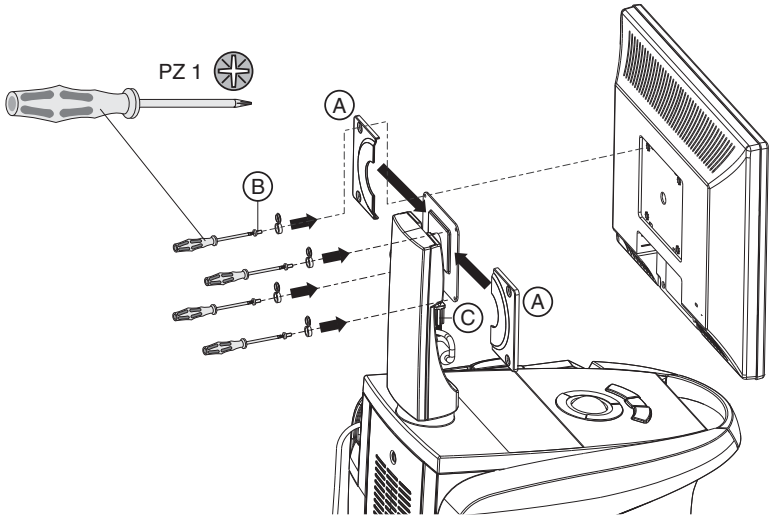
5. Remove cover by pulling it down diagonally.
6. Remove the four screws **(D)** and take off the tilt joint.

Attaching the covers



1. Fasten the tilt joint to the monitor support with four screws **(A)**.
2. Place the front cover on the monitor support and fasten it with four screws **(B)** (PT screws F4x22).
3. Place the back cover on the monitor support and fasten it with one screw.

Mounting the monitor



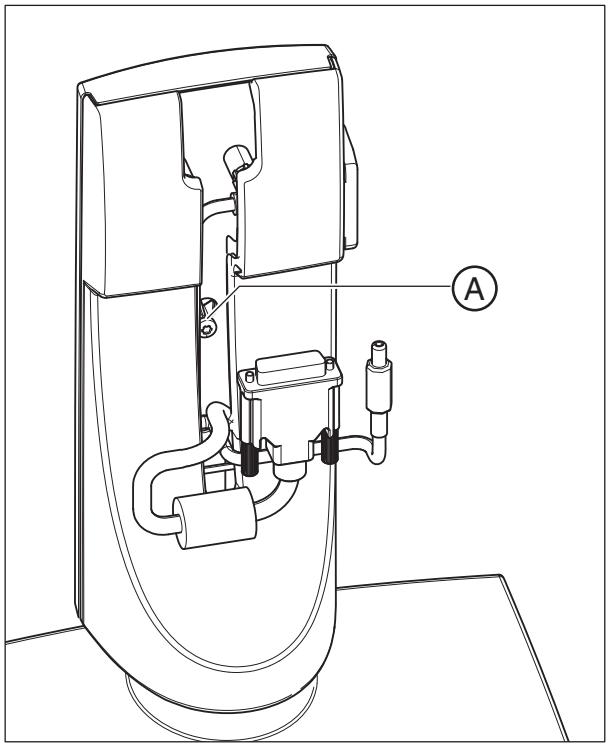
1. Place the new monitor on the tilt joint and temporarily tighten the top left screw **(B)** fully to secure it.
2. Place the right cover **(A)** on and tighten the monitor with 2 screws and screw covers.

3. Remove the screw **(B)**, attach the left cover **(A)** and fasten the monitor with 2 screws and screw covers.
4. Close the screw covers.
5. Plug in the DVI plug **(C)** and screw it tight.
6. Connect the power supply plug.

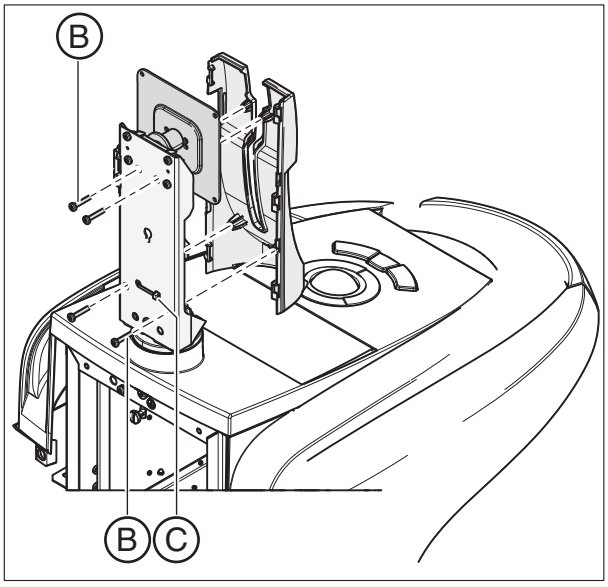
4.3.1.3 Replacing the DVI cable

Installation kit	Order No.
Monitor DVI cable (L7)	62 35 951

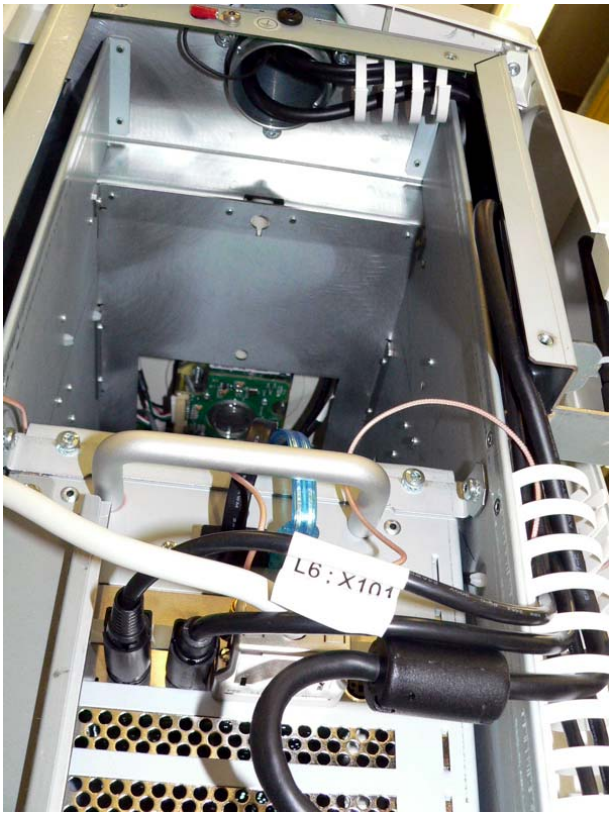
Removing the DVI cable



1. Loosen the screw **(A)** of the back cover from the front.
2. Lift off the back cover and remove it.



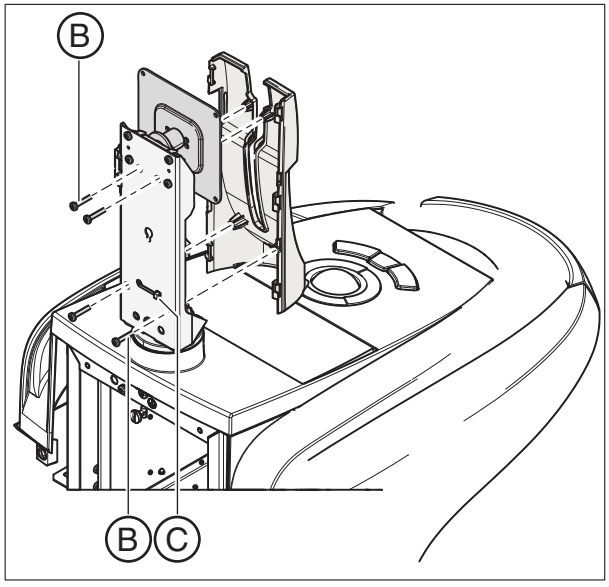
3. Remove the four screws **(B)** of the front cover.
4. Remove cover by pulling it down diagonally.
5. Remove the cable tie **(C)**.



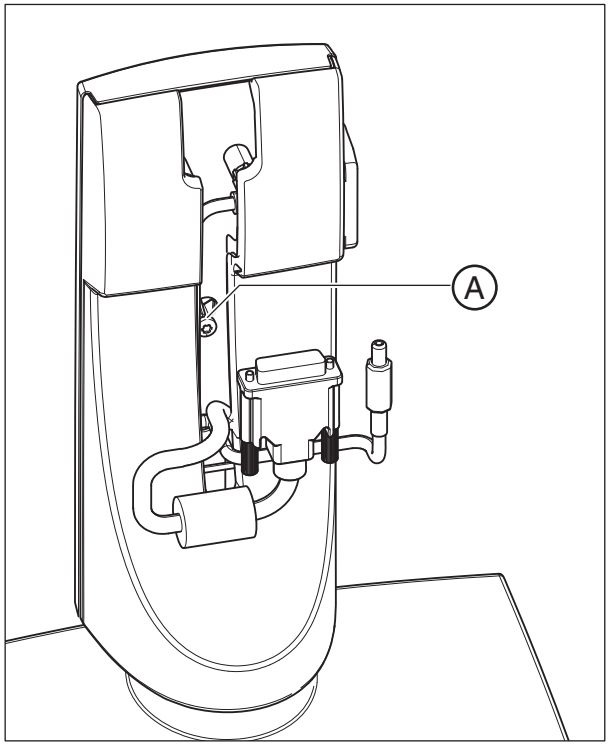
6. Remove the DVI cable from the cable duct.
7. Remove the DVI cable plug from the monitor and from the PC.
8. Carefully pull the DVI cable out of the device.

Inserting the DVI cable

1. Place the new DVI cable in the acquisition unit and connect the cable with the PC and the monitor.
2. Lay the new DVI cable in the cable duct as shown above.



3. Fasten the cables to the monitor support with a cable tie **(C)**.
4. Place the front cover on the monitor support.
5. Secure the cover with the screws **(B)**.
6. Place the back cover on the monitor support.

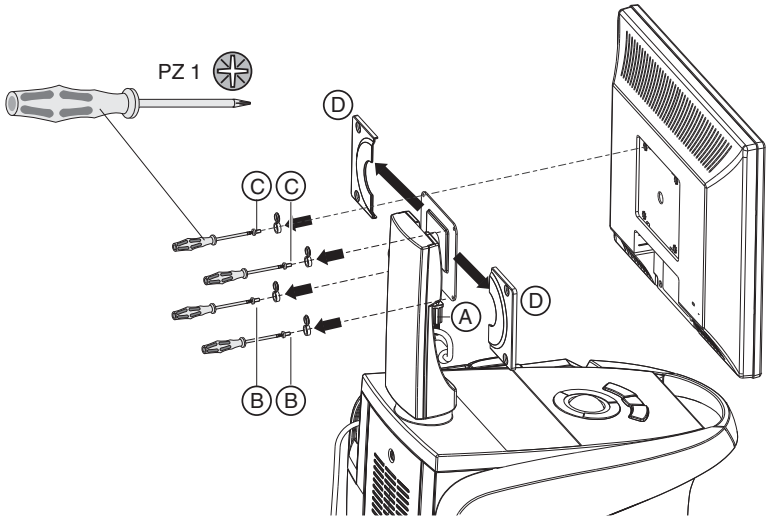


7. Secure the cover with the screw **(A)**.

4.3.1.4 Replacing the monitor support

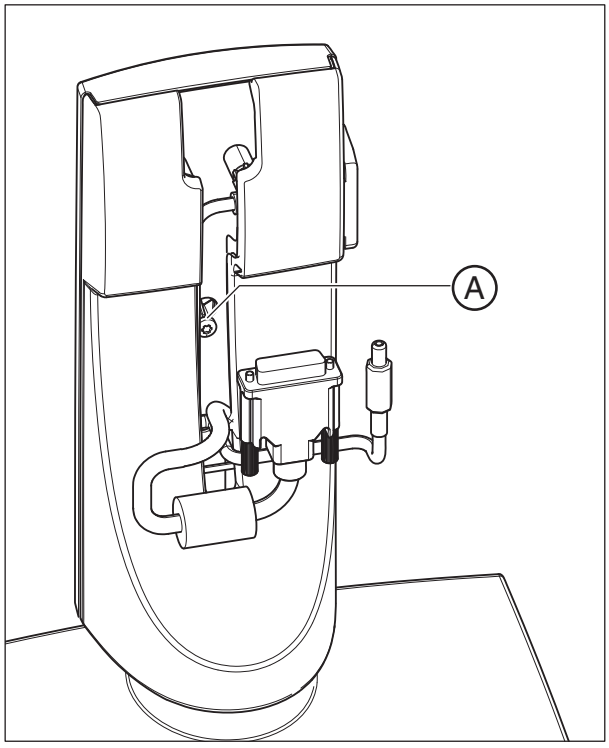
Installation kit	Order No.
Monitor support	62 35 886

Removing the monitor

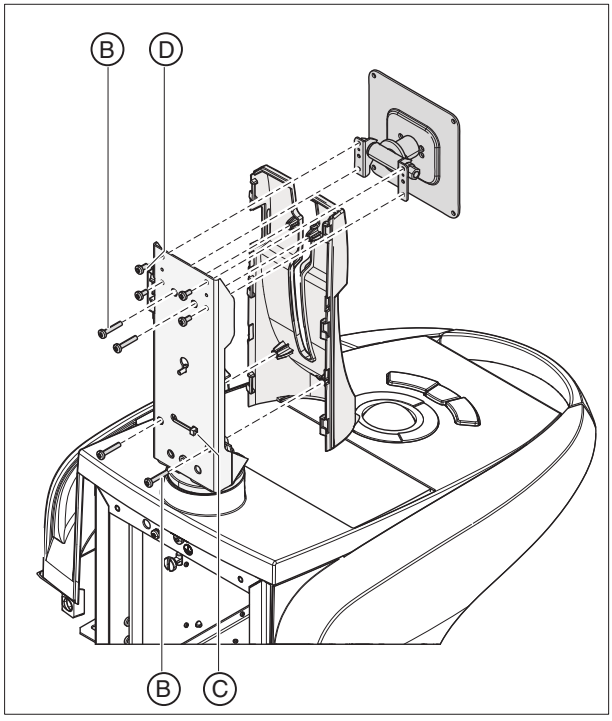


1. Tilt the tilt joint back.
2. Remove the DVI plug **(A)** and the voltage supply plug from the monitor.
3. Open the screw cover if needed with a flat-head screwdriver. Hold the monitor and remove the lower screws first **(B)**, then remove the two upper screws **(C)**. Make sure that the covers **(D)** don't fall down.
4. Remove the screws **(B)** and **(C)** along with the screw covers and the housing covers **(D)**.
5. Remove the monitor from the tilt joint.

Removing the tilt joint



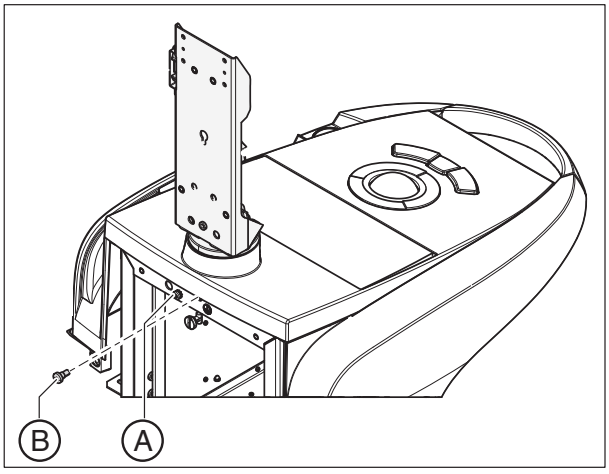
1. Loosen the screw **(A)** of the back cover from the front.
2. Lift off the back cover and remove it.



3. Remove the screws **(B)** of the front cover.
4. Remove the cable tie **(C)**.

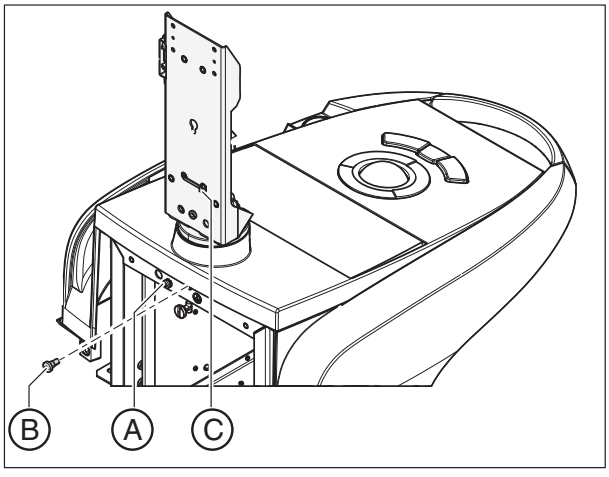
5. Remove cover by pulling it down diagonally.
6. Remove the four screws **(D)** and take off the tilt joint.

Removing the monitor support



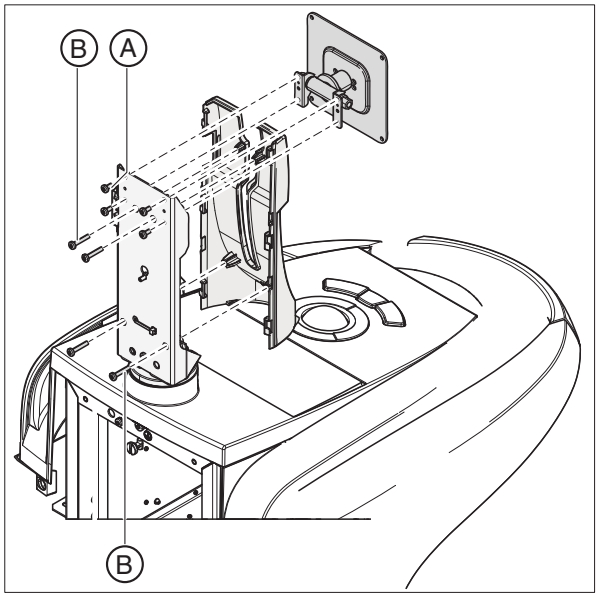
1. Remove the screw **(A)** and detach the ground wire.
2. Remove the screw **(B)** of the monitor support.
3. Pull the monitor support up. Do not damage the cable in the process.

Installing the monitor support



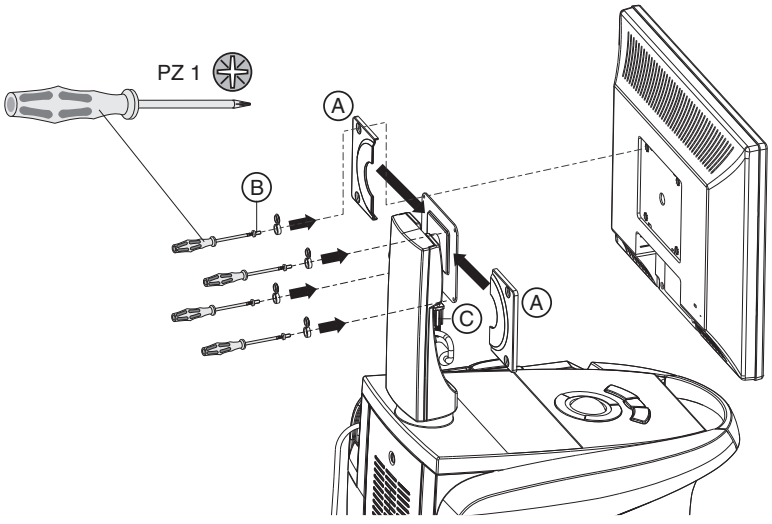
1. Place the monitor support on the intended fitting on the acquisition unit.
2. Secure the monitor support with the screw **(A)**.
3. Fasten the ground wire **(B)** to the acquisition unit with a screw and washer. Make sure that the ground wire is lying right on the acquisition unit.
4. Position the cable for the USB connection and fasten it to the monitor support using two screws.
5. Connect the cables to the monitor support with a cable tie **(C)**.

Attaching the covers



1. Fasten the tilt joint to the monitor support with four screws **(A)**.
2. Place the front cover on the monitor support and fasten it with four screws **(B)** (PT screws F4x22).
3. Place the back cover on the monitor support and fasten it with one screw.

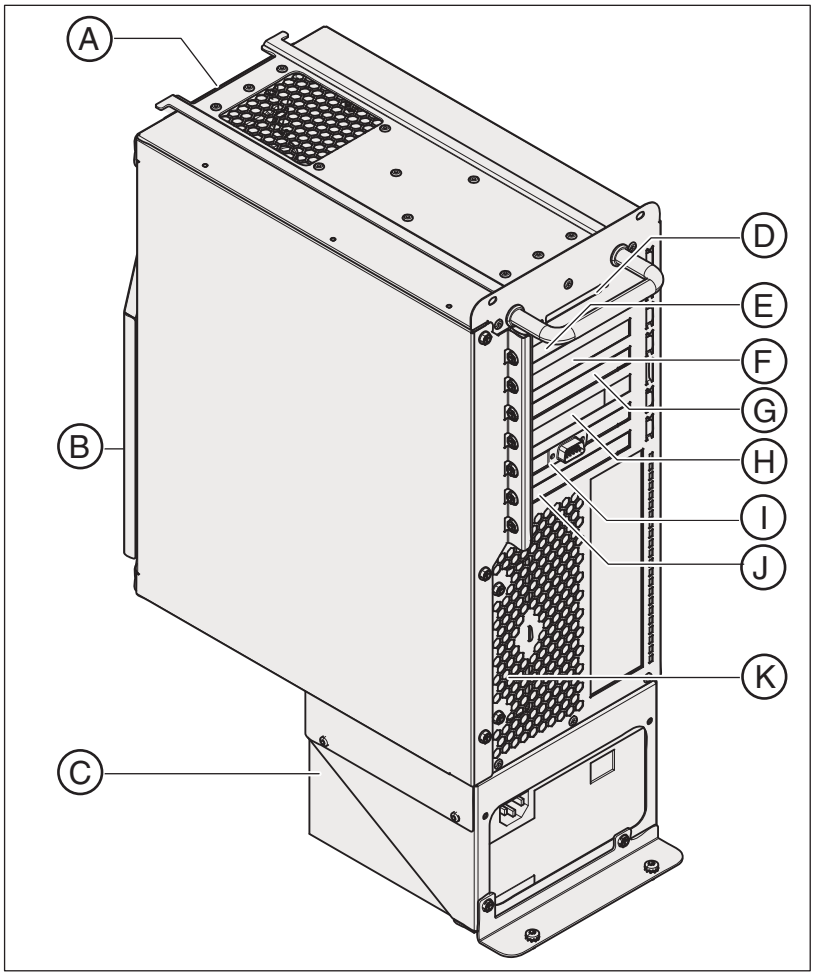
Mounting the monitor



1. Place the new monitor on the tilt joint and temporarily tighten the top left screw **(B)** fully to secure it.
2. Place the right cover **(A)** on and tighten the monitor with 2 screws and screw covers.
3. Remove the screw **(B)**, attach the left cover **(A)** and fasten the monitor with 2 screws and screw covers.

4. Close the screw covers.
5. Plug in the DVI plug **(C)** and screw it tight.
6. Connect the power supply plug.

4.3.2 PC of the acquisition unit



PC slot assignment

A	Loudspeakers		G	Free slot; FireWire
B	Fan		H	Free slot
C	Power supply unit		I	Graphic card slot
D	SATA connection (DVD)		J	USB ports
E	WLAN card slot		K	Hard disk
F	Supply board (VP) slot			

4.3.2.1 Removing and inserting the PC

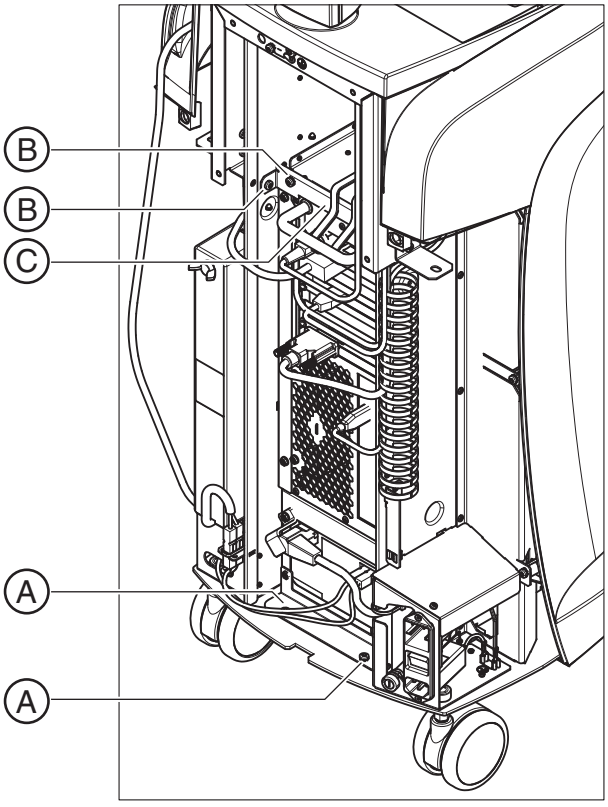
NOTICE

Order no. in the spare parts list

You will find the order number of the corresponding spare part in the CEREC AC spare parts list.

Removal

✓ The back panel is removed, see Removing and inserting the back panel [→ 39].



1. Remove all cables from the PC.
2. Remove the two screws **(A)**.
3. Remove the four screws **(B)** and remove them together with the securing plate **(C)**. Be careful not to lose the washers.
4. Pull the PC up to the safety stop and raise it slightly to remove it from the housing.
5. Place it down on one side.

Opening the PC

1. Remove the three screws for the side cover.
2. Pull the cover towards the front and lift it out to one side.

Closing the PC

1. Place the cover on the PC and push the cover towards the rear until the PC is closed.
2. Secure the cover with three screws.

Installation

1. Hang the PC in the track intended for this purpose.

NOTICE

Cables can be damaged.

Pay attention to the cables when inserting and moving the PC. Never kink the cables.

2. Push the PC completely into the acquisition unit.
3. Fasten the PC to the acquisition unit with both screws **(A)**.
4. Secure the safety plate **(C)** with the four screws **(B)**.
5. Attach all cables to the PC.

4.3.2.2 Replacing the hard drive

NOTICE

Order no. in the spare parts list

You will find the order number of the corresponding spare part in the CEREC AC spare parts list.

NOTICE

Position in the PC

See the overview illustration to determine the position in the PC, see PC of the acquisition unit [→ 55].

✓ The PC is removed and opened, see Removing and installing the PC [→ 55].

1. Remove all cables from the hard drive.
2. Hold the hard drive with a hard drive holder and remove the four screws for the hard drive holder.
3. Remove the hard drive holder.
4. Remove the four screws and any hard drive spacers.
5. Place the new hard drive into the hard drive holder.
6. Tighten the screws for the hard drive and use spacers if necessary.
7. Place the hard drive holder in the PC, but don't lay it down.
8. Fasten the hard drive holder to the PC with the four screws.
9. Reconnect the cables to the hard drive.

4.3.2.3 Boards

4.3.2.3.1 Replacing the WLAN card

Installation kit	Order No.
HQ WLAN card	62 36 371

NOTICE

Position in the PC

See the overview illustration to determine the position in the PC, see PC of the acquisition unit [→ 55].

✓ The PC is removed and opened, see Removing and installing the PC [→ 55].

1. Remove the screw from the PCI slot plate and pull the WLAN card up and out of the PC.
2. Insert the new WLAN card and lock it in the slot.
3. Fasten the slot plate with a screw.

4.3.2.3.2 Inserting the FireWire card (for InEos)

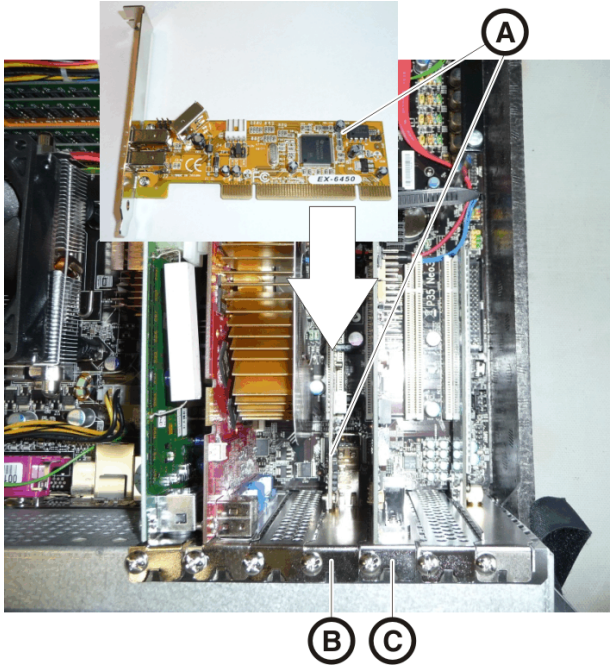
Installation kit	Order No.
PCI FireWire card	62 40 845

NOTICE

Position in the PC

See the overview illustration to determine the position in the PC, see PC of the acquisition unit [→ 55].

✓ The PC is removed and opened.



A	FireWire PCI card
B	Slot (FireWire PCI card installed)
C	Supply board VP

1. Remove the free PCI slot plate next to the VP supply board.
2. Insert the FireWire PCI card and lock it into the slot.
3. Fasten the PCI slot plate with a screw.

4.3.2.3.3 Replacing the supply board (VP)

Installation kit	Order No.
Supply board, ERS	61 37 421
Supply board, REP	61 37 439

NOTICE

Position in the PC

See the overview illustration to determine the position in the PC, see PC of the acquisition unit [→ 55].

✓ The PC is removed and opened, see Removing and installing the PC [→ 55].

1. Remove the two screws of the board holder and fold the board holder up.
2. Pull the five plugs off of the supply board.
3. Remove the screw from the PCI slot plate and pull the supply board upward and out of the PC.
4. Insert the new supply board and lock it in the slot.
5. Fasten the PCI slot plate with a screw.
6. Insert the board holder in the PC and fasten it with the two screws.

4.3.2.3.4 Replacing the graphics card

Installation kit	Order No.
HA-HX graphics card	62 24 468

NOTICE

Position in the PC

See the overview illustration to determine the position in the PC, see PC of the acquisition unit [→ 55].

✓ The PC is removed and opened, see Removing and installing the PC [→ 55].

1. Remove the two screws of the board holder and fold the board holder up.
2. Remove the plug from the graphics card.
3. Remove the screw from the PCI slot plate and pull the graphics card up out of the PC.
4. Insert the new graphics card and lock it in the slot.
5. Place the edge protector on the end of the graphics card. It has to be located underneath the board holder when installed.
6. Fasten the PCI slot plate with a screw.
7. Insert the board holder in the PC and fasten it with the two screws.

4.3.2.4 Replacing the loudspeakers

Installation kit	Order No.
Loudspeaker unit (L20)	62 36 587

NOTICE

Position in the PC

See the overview illustration to determine the position in the PC, see PC of the acquisition unit [→ 55].

✓ The PC is removed and opened, see Removing and installing the PC [→ 55].

1. Remove the loudspeaker cable from the VP.
2. Remove the four fastening screws of the loudspeaker from the outside.
3. Lift the loudspeakers together with the cover grid out of the PC.
4. Remove the cover grid from the loudspeaker.
5. Place the new loudspeaker in the PC and place the cover grid over it.
6. Fasten the loudspeaker to the PC with the four screws.
7. Plug the loudspeaker cable into the VP.

4.3.2.5 Replacing fans (CEREC AC with Bluecam)

Installation kit	Order No.
Housing fan	62 36 447

NOTICE

Position in the PC

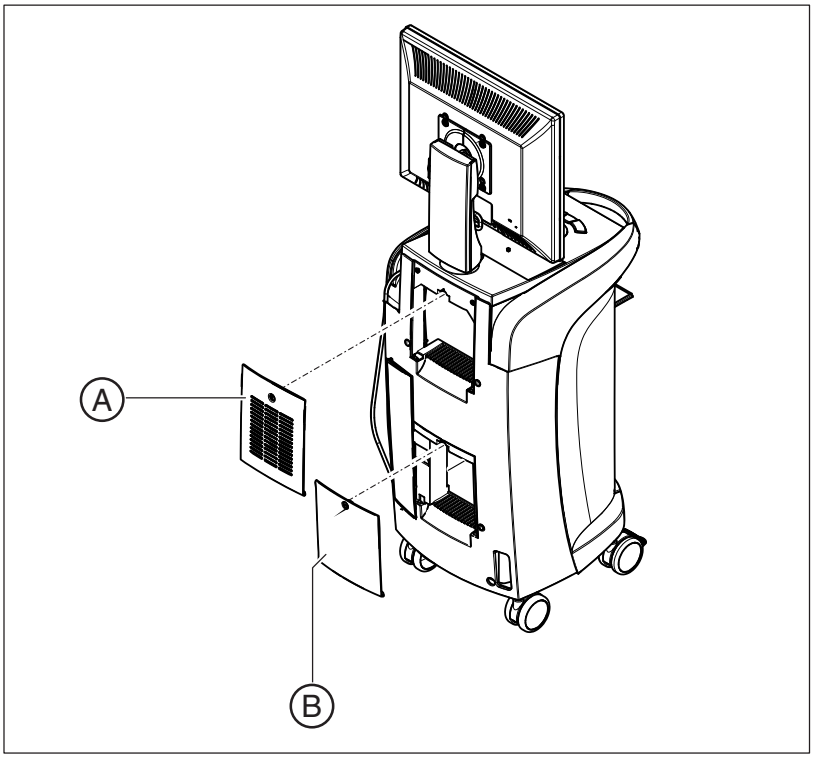
See the overview illustration to determine the position in the PC, see PC of the acquisition unit [→ 55].

✓ The PC is removed and opened, see Removing and installing the PC [→ 55].

1. Remove the plugs from the fan.
2. Slide the top fan laterally towards the other fan and carefully remove it from the PC.
3. Slide the remaining fan laterally and carefully remove it from the PC.
4. Replace the defective fan.
5. Insert the fan and slide it laterally to its position.
6. Insert the top fan and slide it laterally to its position.
7. Connect the plugs of the fans.

4.3.2.6 Replacing fans (CEREC AC with Omnicam)

Fan behind the DVD drive



NOTICE

Open with coin.

Use a coin to open the latch. Turn counterclockwise.

1. Open door **B** on the back panel.
2. Disconnect the round connector for the fan power supply from the RC board. To do so, pull the back panel upward from behind.
3. Guide the cable for the power supply through the back panel.
4. Open door **A** and remove it with the fan.
5. Disconnect the fan from door **A** using a screwdriver.

Fan on the right-hand side

1. Remove the back panel as described in the chapter Removing and inserting the back panel [→ 39] .
2. Disconnect the power supply cable from the RC board.
3. Unscrew the screw connections which connect the fan to the built-in unit of the acquisition unit.
4. Remove the fan

4.3.2.7 Replacing the power supply unit

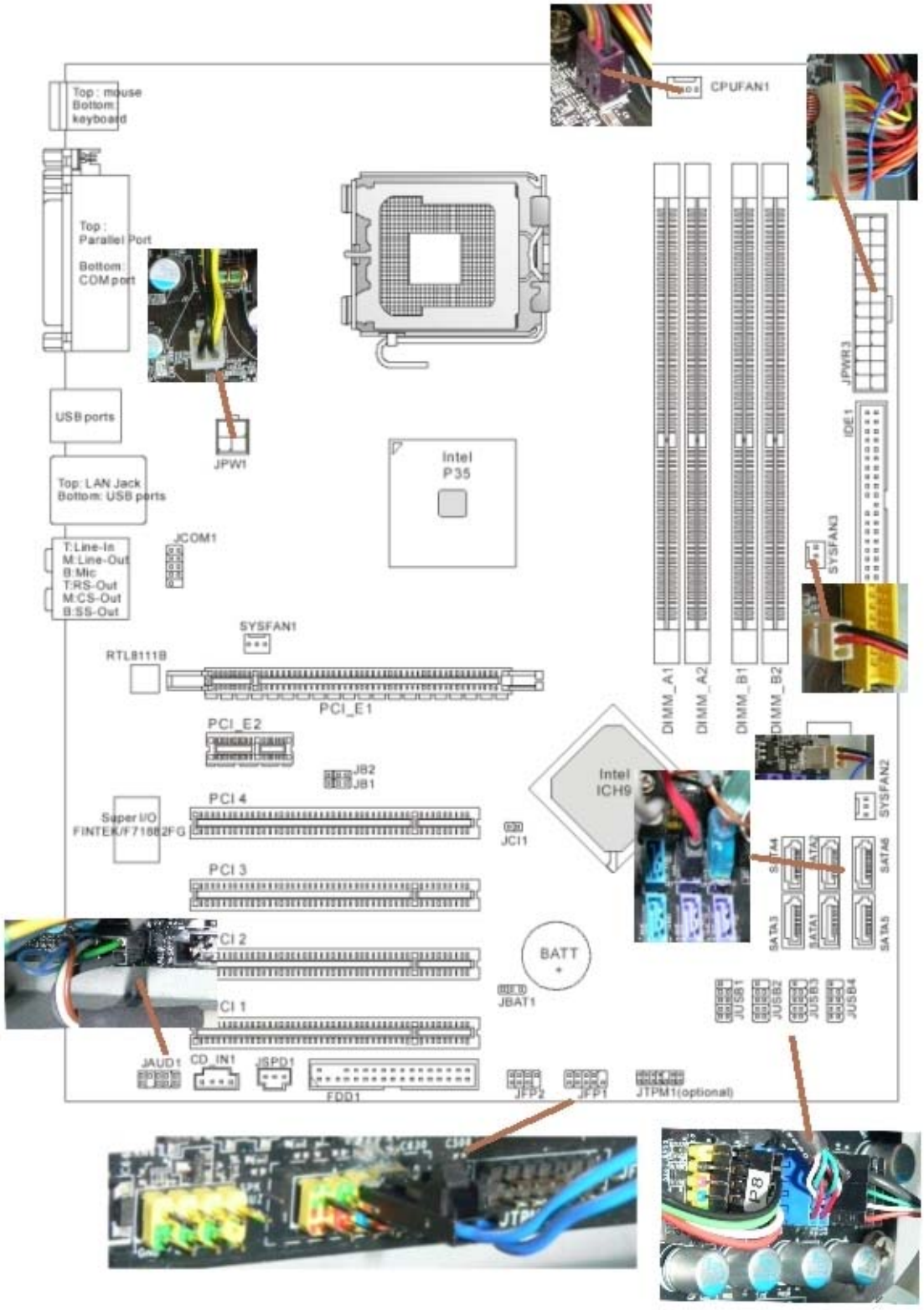
Installation kit	Order No.
UPS PC power supply unit	61 86 477

NOTICE

Position in the PC

See the overview illustration to determine the position in the PC, see "PC of the acquisition unit [→ 55]".

Mainboard connector assignment

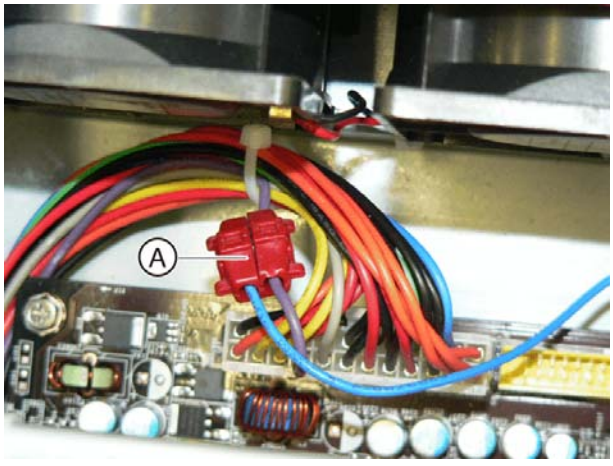


Removing the power supply unit

✓ The PC is removed and opened, see Removing and installing the PC [→ 55].

✓ The hard drive with hard drive holder is removed, see Replacing the hard drive [→ 57].

1. Remove both screws of the board holder and remove the cable tie.
2. Remove the board holder.
3. Remove all power supply plugs.
4. Disconnect the power supply plug from the mainboard (motherboard).



5. Remove the connector from the supply board and the mainboard (**A**).

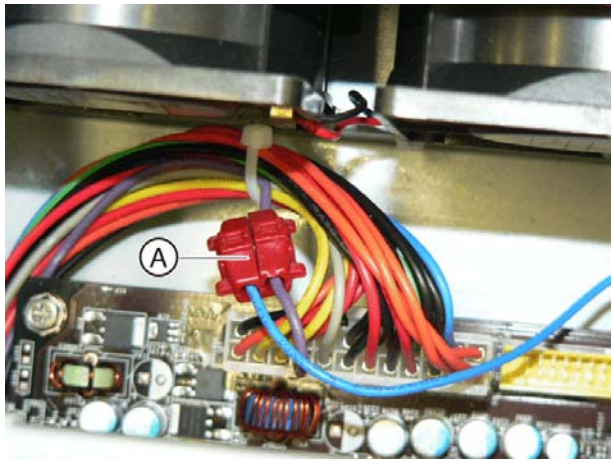
NOTICE

When detaching the USB cable of the power supply unit, note the positions for subsequent reconnection.

6. Remove the USB cable from the power supply unit and pull it out.
7. Remove the two screws of the ATX angle bracket from the PC.
8. Remove the four screws fastening the power supply unit to the holder.
9. Tilt the power supply unit and pull it out diagonally.

Installing the power supply unit

1. Insert the power supply unit in the holder provided for this purpose.
2. Position the power supply unit with the four screws. Tighten the screws securely only after all four of them have been set.
3. Fasten the ATX angle bracket to the PC with two screws.
4. Reconnect the USB cable of the power supply unit. Observe the notes you made when removing.



5. Reconnect the supply board and the mainboard using connector **A**.
6. Reconnect the power supplies.
7. Insert the board holder in the PC and fasten it with the two screws. Bunch the cables together and fasten them to the board holder with a cable tie. Do not tie the cables too short.
8. Place the hard drive holder in the PC, but don't lay it down.
9. Fasten the hard drive holder to the PC with the four screws.
10. Reconnect the cables to the hard drive.

NOTICE
Make sure that the fans are not blocked by the cables.

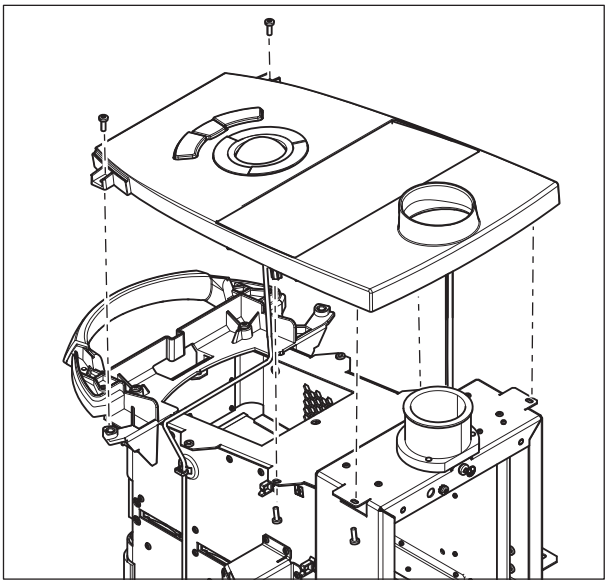
4.3.3 Control unit

4.3.3.1 Removing and inserting the control unit

Installation kit	Order No.
Control unit, compl. (without keyboard)	62 35 852

Removal

✓ All covers are removed, see Removing covers [→ 39].
✓ The monitor and monitor support are removed, see Monitor [→ 43].



1. Remove the six screws of the control unit.
2. Raise the complete control unit slightly.
3. Disconnect the three-pole plug of the footswitch and the two-pole plug of the camera heater from the trackball button board. Then disconnect the two-pole plug from the keyboard board.
4. Remove the cable ties.
5. Disconnect the remaining plugs between the keyboard board and the trackball button board.
6. Remove the built-in keyboard from the control unit.

Installation

NOTICE

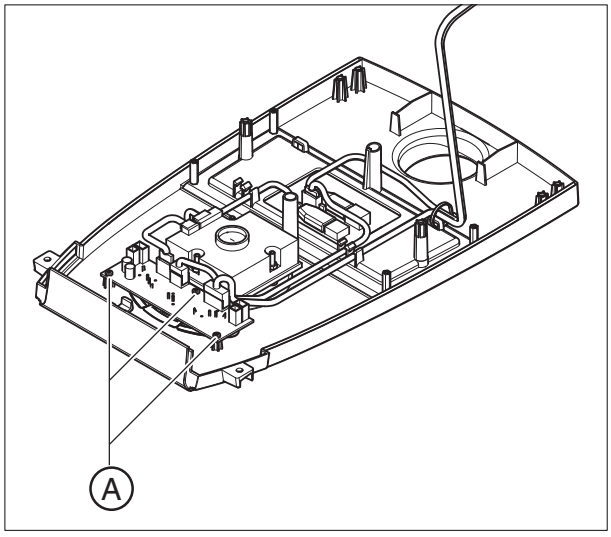
When performing the following installation steps, make sure that all plug connections snap in place correctly.

1. Mount the keyboard previously removed on the new control unit.
2. Make the plug connections between the keyboard and the trackball button board.
3. Make the remaining plug connections on the trackball button board and on the keyboard. To do this, connect the cable **(L10)** to connector **X7** (right-handed operation) or **X5** (left-handed operation).
4. Place the control unit on the acquisition unit.
5. Fasten the cables with cable ties and reconnect the plugs.
6. Secure the control unit with the six screws.

4.3.3.2 Replacing the trackball button board

Installation kit	Order No.
CEREC AC trackball button board	61 38 726

✓ The control unit is removed, see Removing and inserting the control unit [→ 65].



1. Disconnecting the plugs from and to the trackball button board.

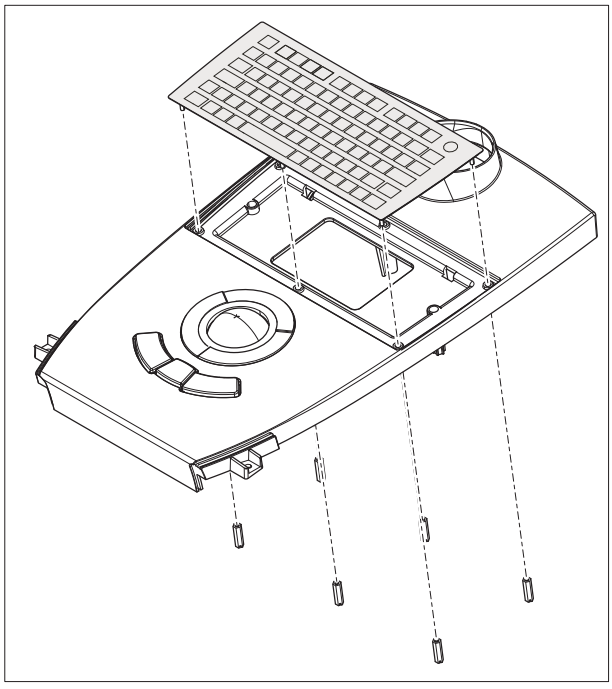
NOTICE
Make sure that no plugs or cables are damaged upon removal.

2. Remove the three screws **(A)**.
3. Remove the trackball button board by pulling it upwards.
4. Insert the new trackball button board and fasten it to the control unit with the three screws **(A)**.
5. Attach the plugs from and to the trackball button board.

4.3.3.3 Replacing the keyboard

Installation kit	Order no.
German keyboard	62 35 795
English keyboard	62 35 803
French keyboard	62 35 811
Spanish keyboard	62 35 829
Italian keyboard	62 35 837
US keyboard	62 35 787
Russian keyboard	63 41 395

✓ The control unit is completely removed, see Removing and inserting the control unit [→ 65].



1. Remove the plugs from the back side of the keyboard.
2. Remove the six studs.
3. Remove the keyboard from the control unit.
4. Place the keyboard in the control unit.

NOTICE

Keyboard alignment

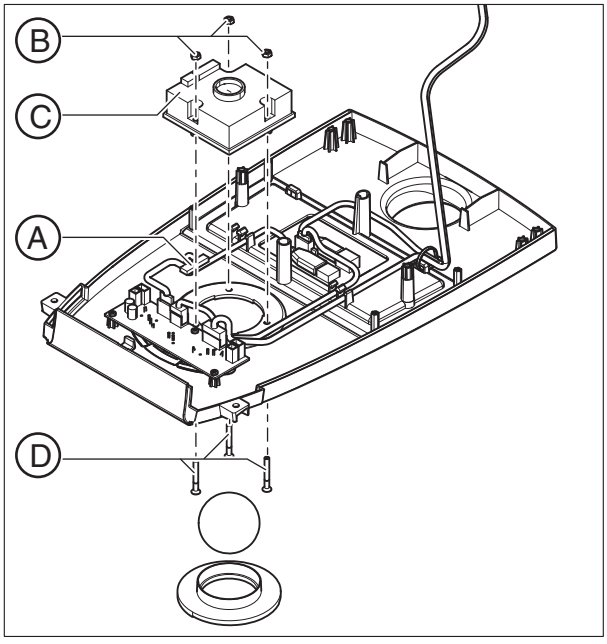
Align the keyboard while installing it.

5. Fasten the keyboard to the control unit with the studs.
6. Connect the plugs to the new keyboard. Make sure that they engage correctly.

4.3.3.4 Replacing the optical trackball

Installation kit	Order No.
Optical trackball	62 35 878

✓ The control unit is completely removed, see Removing and inserting the control unit [→ 65].

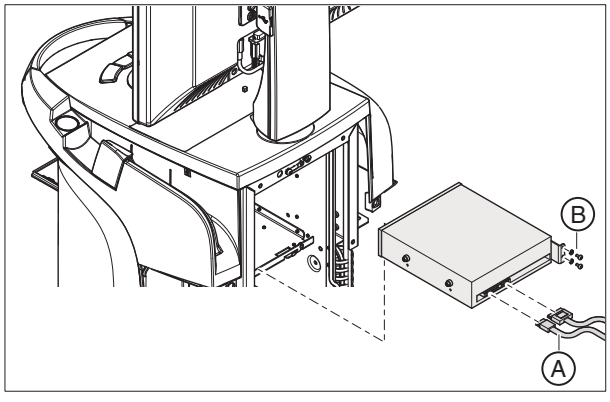


1. Unscrew the ring around the trackball ball and remove the ball.
2. Remove the cables **(A)**.
3. Remove the three nuts **(B)** used to attach the optical trackball **(C)** to the control unit and remove the screws **(D)**.
4. Remove the optical trackball.
5. Fasten the new optical trackball with the screws **(D)** and nuts **(B)**.
6. Connect the cables **(A)** to the optical trackball.
7. Place the trackball back in position and fasten the ring.

4.3.4 Replacing the DVD drive

Installation kit	Order No.
DVD drive, compl.	62 36 199

Removal



1. Open the top door on the back panel.

NOTICE

Open with coin.

Use a coin to open the latch. Turn counterclockwise.

2. Remove the cable **(A)** that is attached to the drive.
3. Remove the screws **(B)**.

NOTICE

Screws with serrated lock washers

Be careful not to lose the serrated lock washers.

4. Remove the entire drive.

Installation

1. Push the new drive onto the slot.
2. Fasten the screws **(B)**.
3. Reattach the door on the back panel.

4.3.5 Fuses

4.3.5.1 Replacing the main fuse

⚠ WARNING

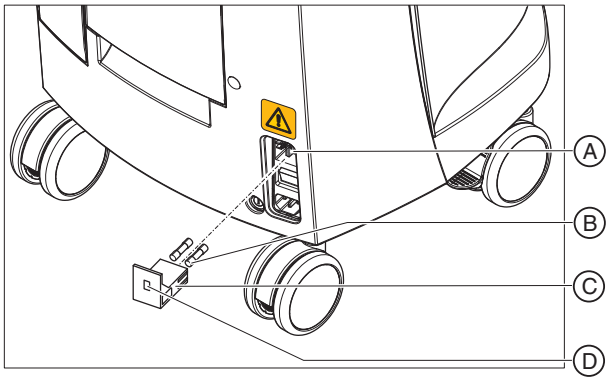
Electric shock

Disconnect the power plug at the unit end before replacing the fuses.

NOTICE

Fuse type

Use only fuses of the same type in the fuse module!



A	Voltage selection insert	C	Fuse module
B	Main fuses	D	Window

Fuses: T8A H 250V Order No. 62 33 188

✓ The power plug must be disconnected.

1. Unlatch the fuse module with a screwdriver and pull the module out.
2. Replace the defective fuses.
3. Reinsert the fuse module.

4.3.5.2 Replacing fuse F3

⚠ WARNING

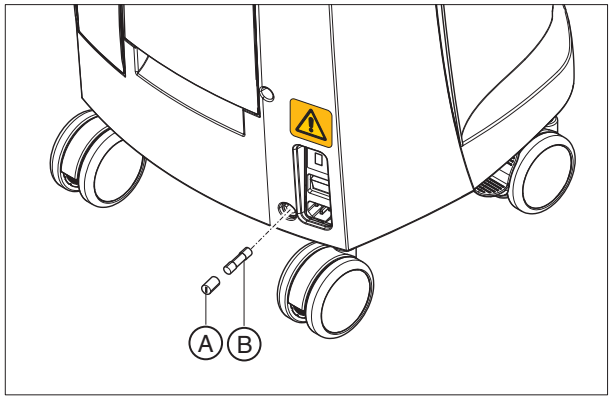
Electric shock

Disconnect the power plug at the unit end before replacing the fuses.

NOTICE

Fuse type

Use only fuses of the same type!



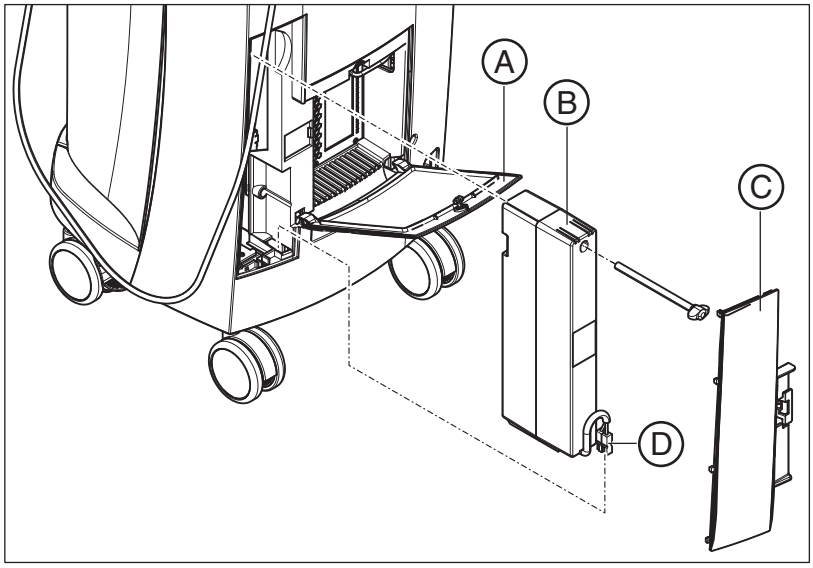
A	Fuse holder	B	Fuse

Fuses: T2,5A L 250V Order No. 46 57 656

✓ The power plug must be disconnected.
1. Use a screwdriver to unscrew the fuse holder.
2. Replace the defective fuse.
3. Screw the fuse holder back in.

4.3.6 Replacing the battery

Installation kit	Order No.
24V battery pack	62 36 470



A	Bottom door	C	Battery cover
B	Storage battery	D	Battery connector

1. Open the lower door on the back panel.

NOTICE

Open with coin.

Use a coin to open the latch. Turn counterclockwise.

2. Remove the battery cover.
3. Unplug the battery connector.
4. Unscrew the fastening screw and remove the battery.
5. Insert the new battery into the battery compartment with the fastening screw and screw it down.
6. Plug in the battery plug.
7. Attach the battery cover.
8. Put the door back in position and lock it.

4.3.7 Replacing the isolating transformer

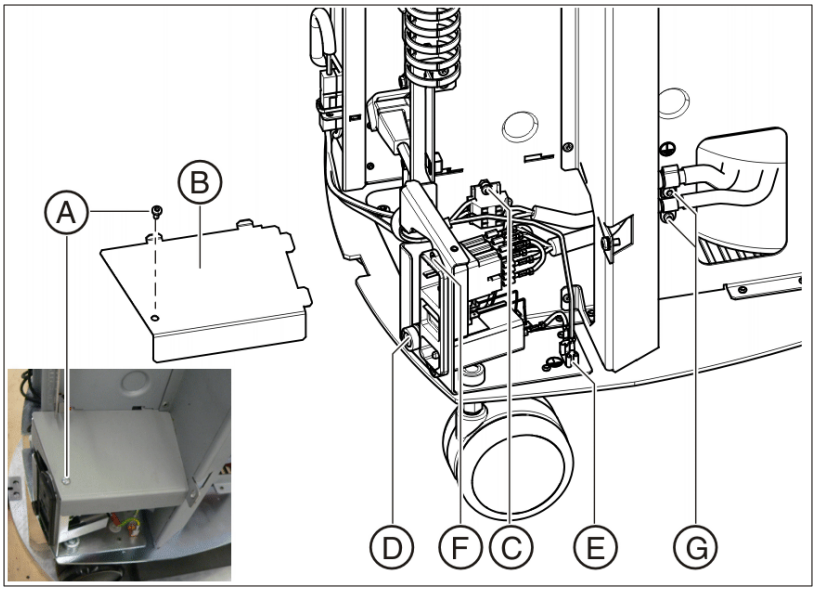
Installation kit	Order No.
Isolating transformer, compl.	62 36 348

Removing the isolating transformer

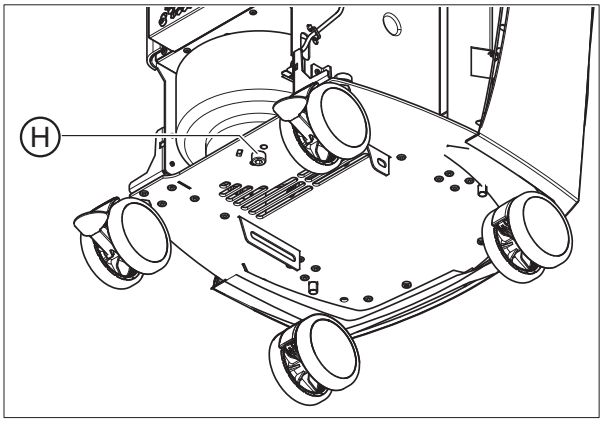
✓ The back panel is removed, see Removing and inserting the back panel [→ 39].

✓ The front panel is removed, see Removing and inserting the front panel [→ 40].

✓ The footswitch is removed, see Replacing the footswitch [→ 74].



1. Carefully place the acquisition unit on its back.
2. Remove the screw **(A)** of the top cover **(B)**. Pull the cover towards the front, then lifting it up and out.
3. Remove the ground wire **(E)** with pliers.
4. Remove the screws **(F)** and take out the entire fuse block.
5. Unscrew the holding nuts **(D)** of fuse F3 and remove the fuse from its holder.
6. Remove the screws of the terminals **(C)**.
7. Remove the two screws from terminal block **G**.



8. Unscrew the screw **(H)** from the transformer and remove it.
9. Move the fuse block inward to the transformer.
10. Remove the transformer.

Installing the isolating transformer

1. Insert the new transformer.
2. Move the fuse block to the holder.
3. Fasten the screw **(H)** of the transformer.
4. Fasten the terminal block **(G)** with the two screws.

5. Insert the ground wire **(E)**.
6. Position fuse F3 and secure it with the holding nuts **(D)**.
7. Fasten the terminals **(C)** with one screw each.
8. Position the cover **(B)** and fasten it with the screws **(A)**.
9. Position the fuse block and fasten it with the screws **(F)**.
10. Place the acquisition unit upright again.

4.4 Mechanical components

4.4.1 Replacing the air filter

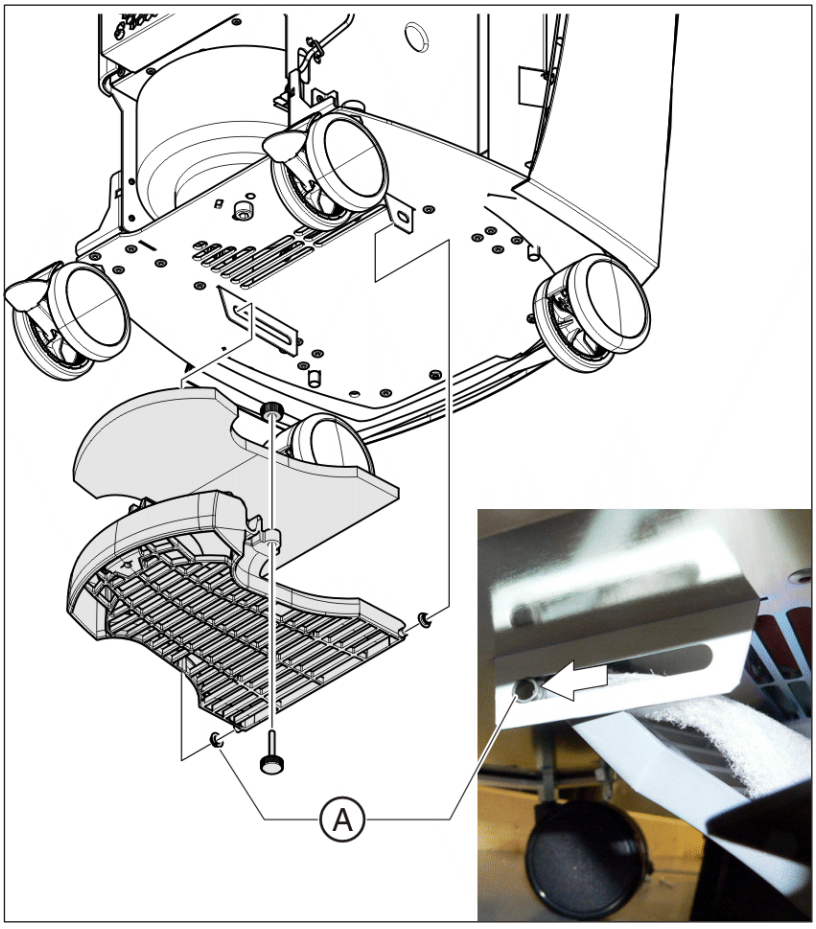
Installation kit	Order No.
Air filter, footswitch	62 37 171

1. Flip the foot pedal down.
2. Pull out the filter.
3. Place a new filter on the foot pedal surface.
4. Close the foot pedal again.

4.4.2 Replacing the foot pedal

Installation kit	Order No.
Foot pedal	62 36 306

1. Flip the foot pedal down.
2. Carefully place the unit on its back.
3. Unhinge the foot pedal.
4. Attach the new foot pedal on the right side.



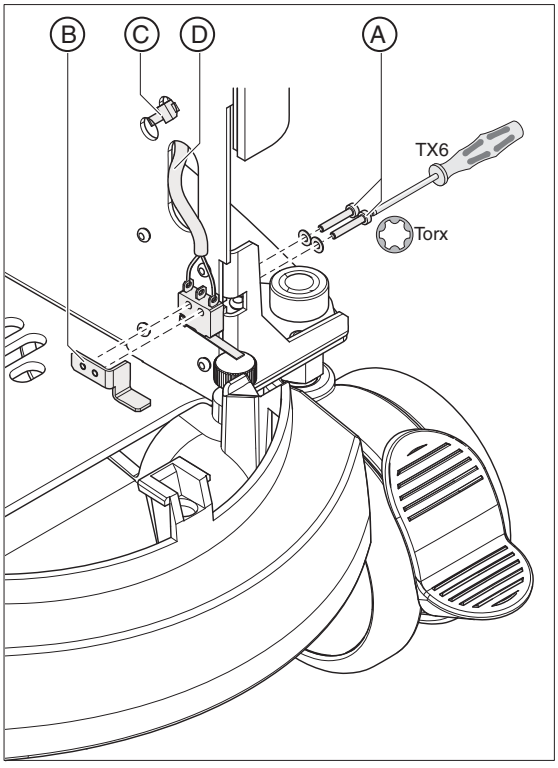
5. Attach the foot pedal (**A**) on the left side diagonally in the track and move it into the correct position.
6. Insert a new air filter if needed.
7. Adjust the footswitch's switching point with the adjustment screw.

4.4.3 Replacing the footswitch

Installation kit	Order No.
Footswitch cable (L10)	62 36 520

✓ The back panel is fully removed, see Removing and inserting the back panel [→ 39].

✓ The front panel is fully removed, see Removing and inserting the front panel [→ 40].



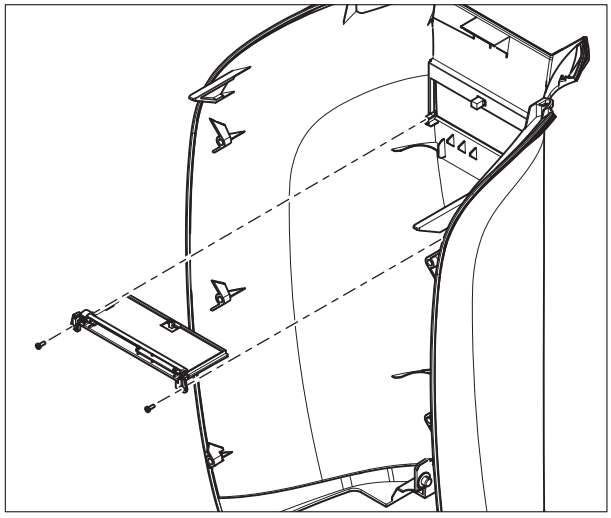
1. Remove the two screws **(A)**. Be careful not to lose the washers.
2. Pull off stop **B**.
3. Remove the connection of the cable to the trackball button board.
4. Cut the cable tie **(C)**.
5. Replace the footswitch (with cable) **(D)** with a new one.
6. Plug the connector onto the trackball button board.
7. Position the stop **(B)** on the footswitch and attach it loosely with the two screws **(A)** and the washers. The stop must be properly aligned to the footswitch (see illustration).
8. Insert the footswitch in the recess and tighten the two screws securely.
9. Bunch the cables with a new cable tie **C**.
10. Reattach all covers.
11. Adjust the footswitch's switching point with the adjustment screw.

4.4.4 Replacing the flap for the DVD drive

Installation kit	Order No.
DVD flap, compl.	62 35 985

Removal

✓ The front panel is removed, see Removing and inserting the front panel [→ 40].



1. Open the DVD flap.
2. Remove the two screws of the DVD flap.
3. Pull the DVD flap to the inside from the front.

Installation

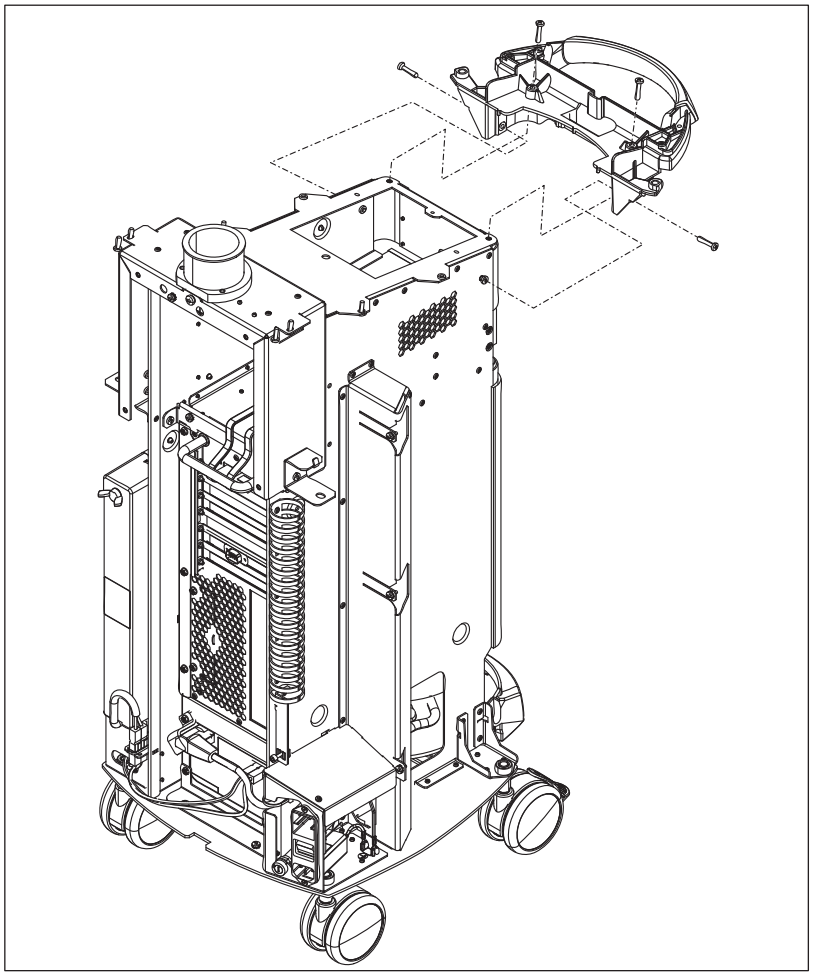
1. Place the DVD flap in the front panel.
2. Secure it with the two screws.
3. Reattach all covers.

4.4.5 Replacing the handle

✓ The covers are removed (see "Removing covers [→ 39]").

✓ The monitor and monitor support are removed (see "Replacing the monitor support [→ 51]").

✓ The control unit is removed (see "Removing and inserting the control unit [→ 65]").

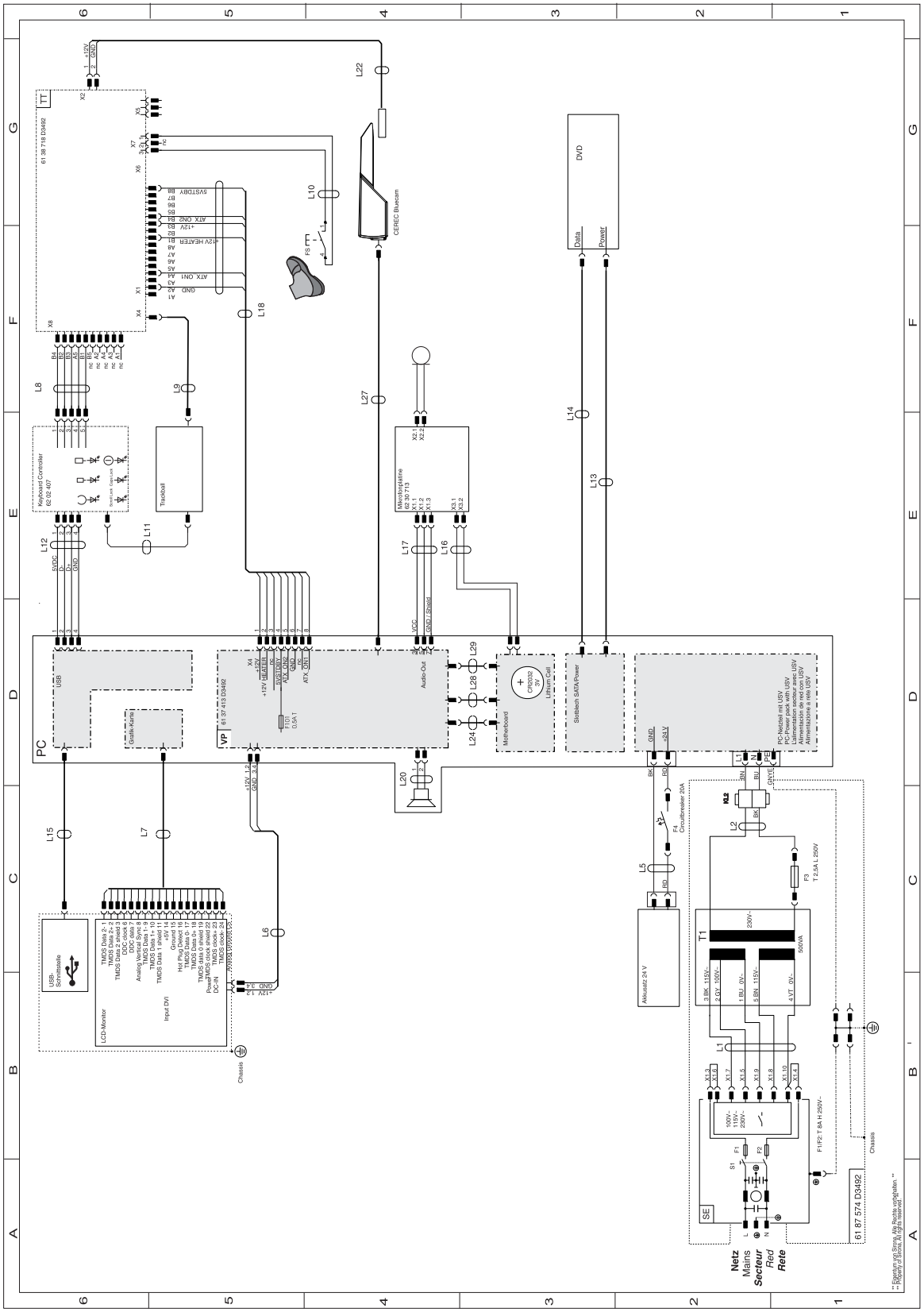


Replacing the handle

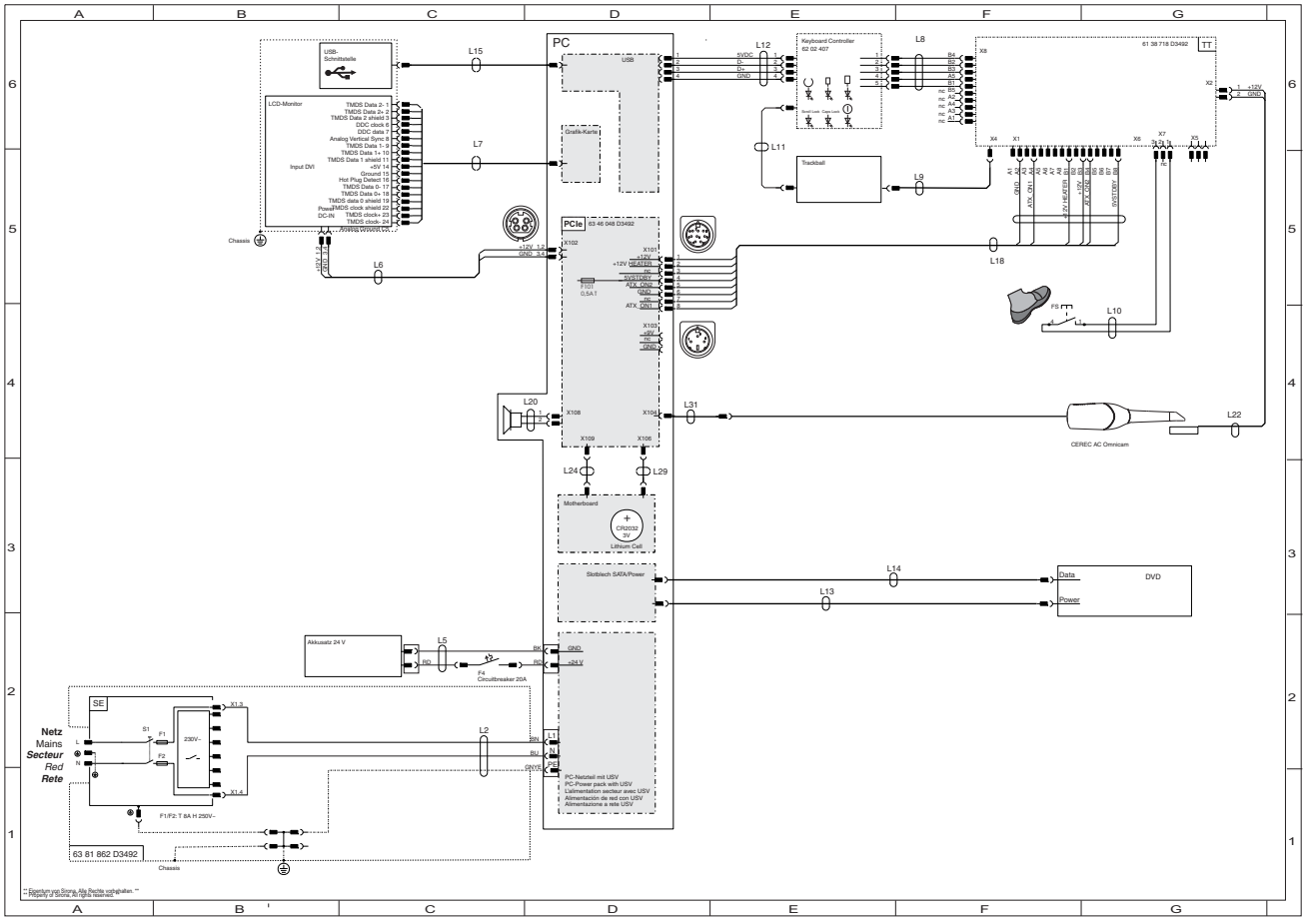
1. Unscrew the four screws from the handle.
2. Screw on the new handle with the four screws.
3. Insert the control unit (see "Removing and inserting the control unit [→ 65]").
4. Install the monitor and the monitor support (see "Replacing the monitor support [→ 51]").
5. Attach the covers (see "Removing covers [→ 39]").

5 Circuit diagrams

5.1 CEREC AC with Bluecam



5.2 CEREC AC with Omnicam



6 Re-test

6.1 When is the re-test carried out?

The acquisition unit CEREC AC must be re-tested every time repair/ retrofitting work affecting one of the following components is completed:

- PC
- PC power supply
- Isolating transformer
- Camera
- Camera cable

A re-test must always be carried out at least every 36 months.

6.2 Description of device type

The acquisition unit CEREC AC is a class I device with a detachable power supply cord. The camera is a type BF applied part.

6.3 To be carried out on completion of the test

1. Visual inspection
2. Protective ground wire resistance
3. Device leakage current
4. Insulation resistance
5. Functional test

6.4 What the test steps involve

6.4.1 Visual inspection

- Check that the device labels are present and legible
- Do the fuses inserted comply with the prescribed rated fuse current and fuse type?
- Are all covers intact? There must be no visible gaps between the covers that could result in injuries or via which contact could be made with electrical components located inside the device.
- There must be no visible damage to any of the cables.
- There must be no scratches penetrating the surface of the display screen.
- There must be no cracks or chips on the prism.

6.4.2 Protective ground wire resistance

The protective ground wire resistance of the power cable (measured from plug to socket) must be ≤ 100 mΩ.

The protective ground wire resistance from the power input of the acquisition unit CEREC AC to the PC rear panel must be ≤ 200 mΩ.

The protective ground wire resistance from the power cable plug to the PC rear panel must be ≤ 300 mΩ.

6.4.3 Device leakage current

The device leakage current must be measured in relation to the PC rear panel. In the case of direct measurement under normal conditions it must be ≤ 0.1 mA. In the case of a first fault (protective ground wire disconnected), it must be ≤ 0.5 mA.

6.4.4 Insulation resistance

Since the camera is an applied part and does not have a patient connection, when re-testing is carried out, the insulation resistance is measured instead of the patient leakage current. An instrument able to provide a test voltage of 500 VDC must be used to take the measurement.

The insulation resistance is measured between:

- Protective ground and PC power supply unit housing
- Protective ground and metal part at the front of the camera lens

In both cases, the insulation resistance must be ≥ 0.1 MΩ.

6.4.5 Functional test

1. Once the above test steps have been completed, restore the acquisition unit CEREC AC to normal operating conditions.
2. Switch the acquisition unit CEREC AC on for the functional test.
3. Once booting is complete, start the CEREC application.
4. Take a camera shot of the calibration piece suspended from the camera.
   ↳ The resulting image must not exhibit any surface defects.

The re-test is now complete.

If any of the test criteria have not been met, the acquisition unit CEREC AC must be repaired accordingly.

➢ Record the completion of the test steps in the test report. The test reports are recorded in a separate document in the relevant national language and can be accessed via the partner portal by quoting the material numbers listed below.

Language	Material number
English	6392364
English	6392372
French	6392380
Spanish	6392398
Italian	6392406
Swedish	6392505
Russian	6392414

Language	Material number
Danish	6392422
Norwegian	6392430
Dutch	6392448
Finnish	6392455
Japanese	6392463
Portuguese	6392471
Korean	6392489
Chinese	6392497

We reserve the right to make any alterations which may be required due to technical improvements.

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